RAILROAD GAZETTE

FRIDAY, JUNE 7, 1895.

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Contributions.

Deflection and Vibration of a Rail.

Lehigh University,
SOUTH BETHLEHEM, Pa., June 1, 1895.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The experiment on the deflection and vibrations of a beam under impact, given by Mr. P. H. Dudley, on the first page of your last issue, is a most interesting and instructive one. It not only shows clearly the danger arising from the impact of a comparatively light load, but it is also valuable as closely confirming to the rules established by the theory of elasticity.

It has long been known that a suddenly applied load produces double the load and double the stress of the same static load, but the exact influence of a load applied with impact is not so well understood. The formula for this case, indeed, I have not seen in any work published in this country, although it will be demonstrated in the forthcoming sixth edition of "Mechanics of Materials." It may be well to note it here, and to show how it is fully in accord with Mr. Dudley's experiment:

Let d be the static deflection due to the load, and let D be the dynamic deflection due to the fall of the load through the height h. Then,

$$D = d\left(1 + \sqrt{\frac{2h}{nd} + 1}\right)$$

in which n is a number depending upon the relative weights of the beam and load, or,

$$n = 1 + \frac{17W}{35P}$$

where W is the weight of the beam and P the weight of the load.

In the experiment the weight of the beam W was 800 lbs., and that of the load P was 100 lbs. Then $n = 4.886$. Also the static deflection d was 0.120 in., and the height of fall h was 12 in. Inserting these values the formula gives the momentary dynamic deflection $D = 0.897$ in., whereas the result found in the experiment was 0.910 in., which is a satisfactory agreement.

The static load Q required to cause the deflection D is given by theory as

$$Q = P\left(1 + \sqrt{\frac{2h}{nd} + 1}\right)$$

and applying this to the given data there is found $Q = 747$ lbs., whereas the experiment gave 750 lbs.

The above formulas are only true when the greatest stress in the beam is less than the elastic limit of the material. Such was the case in this experiment, for the maximum fiber stress on a 30-ft. span of this 80-lb. section, due to a load of 750 lbs. at the middle, is only 6,100 lbs. per square inch, which is probably about one fifth of the elastic limit.

MANSFIELD MERRIMAN.

The Transition Curve.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I want to tell you with what interest I read the article on transition curves in your issue of May 24. The fact is that I have been on the point of writing to you several times of late suggesting just such an inquiry as you have made. Of late there has been a good deal in the engineering periodicals on the subject, notably the article in the *Journal of the Association of Engineering Societies*, which you have no doubt seen. Your article prompts me to ask one or two questions.

Can you tell me why it is that the Pennsylvania lines west of Pittsburgh use transition curves and those east do not? On the whole, the country is such that one might expect the reverse. Mr. Loree is one of the most enthusiastic men in the country on the subject. He has written for the engineers' conference of the P. R. R. an exhaustive paper on the Holborn spiral. The mathematics of it knocked me out in about two pages, but I was able to follow his argument with interest. His tables and system have been in use on all the lines about Indianapolis for some years. Mr. Miller is now putting them in use on the entire Vandalia system.

I want to see some of you write an article on the subject discussing the economy and result of the makeshift of sharp rail depression as against the spiral. I have a notion, that I am not able to corroborate or refute with the information at hand, that not a few disastrous freight wrecks have occurred from the use of the sharp rail depression in this way. Suppose a train to be coming down a western sag at full speed, suppose the brakes to be set for some reason hard on loaded cars and a rough track (outside brakes), and they hit a sharp curve with a depressed rail for only 100 ft.; question: is that short bit of track sufficient to change the course and horizontal plane of the car *always?* As I think it over it would seem to me that sooner or later some car, down on its bearings, brakes set, is going to jump. C. E.

[The position of the Pennsylvania Railroad on this matter of transition curves was perhaps sufficiently explained in a letter written by Mr. Brown, Chief Engineer, to the *Railroad Gazette* April 4, 1890. In this he says: "The elastic curve theory is very nice in an office or college class-room, but I will venture to say that the people who are so enthusiastic in regard to this matter could not run the curve twice in the same place on the ground." He then proceeds to show the plan adopted by his department 10 or 12 years earlier. A 4-deg. curve is thrown in at the center far enough to allow a 30-min. curve 200 ft. long at each end. In elevating a 4-deg. curve for fast passenger trains, at the beginning of the 30-min. curve both rails are level; 200 ft. from the P. C. an elevation of 4 in. is attained, which is kept all the way around the 4-deg. curve, and then run off to 0 on the 30-min. curve. The earlier practice was to begin this superelevation from 100 to 200 ft. back of the P. C., on the tangent. This tends to make two shocks; first, when the train is thrown against the low rail on the tangent; then when it brings up against the outside rail. By the Pennsylvania practice, the curve can be retraced by any one who can run a transit. It is not likely that the character of the country through which the Pennsylvania runs has anything to do with the practice in this matter; nor is it likely that the Chief Engineer or the Engineer of Maintenance of Way would interfere with the Division Engineer who preferred to run in spirals. But naturally, the Division Engineer would adopt the practice preferred by his chief.

With regard to the "make-shift of sharp rail depression," a little discussion of general principles may not be out of place. Certain definite forces, acting along certain definite lines, *must* produce certain definite results. An accidental imperfection in the track will cause a jar, or even a derailment, from a track *supposed* to be perfect; but the more nearly the track design approaches perfection the less will be the probability of jar or disaster, assuming a certain degree of care in track maintenance. Some of the spirals proposed are nearly perfect in design, but "the sharp rail depression" device contains many theoretical defects; and assuming the same degree of care in track maintenance, it would certainly be more dangerous, especially for a car "down on its bearings, brakes set." Probably statistics as to the relative number of derailments would be of no value, owing to the impossibility of knowing in any case how nearly the *real* condition of the track agreed with its theoretical design. Although the spiral is the nearest approach to a theoretically perfect track, there is one radical error in any of the systems proposed. The profile of the outer track is assumed to be as in the sketch (of course enormously exaggerated) i. e., with an *angle* in the profile at the beginning and at the end of the spiral and the radius at any point is made exactly proportional to the distance along the spiral (and also to the ordinates, ab., etc.). With a theoretically perfect spiral, the outer rail should have a profile of the general form of the sketch (Fig. 2), and the radius should vary as the ordinates to this curve. But the mathematics of the Holbrook spiral is mere play compared with the mathematics involved in such a spiral. *Practically* the profile is curved substantially as shown in Fig. 2, but the radius is made to vary as if for Fig. 1.—EDITOR RAILROAD GAZETTE.]

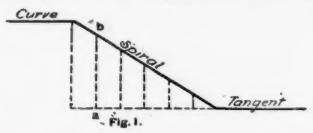


Fig. 1.

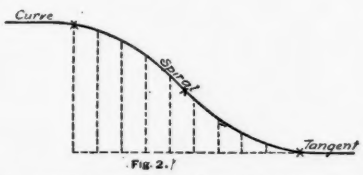


Fig. 2.

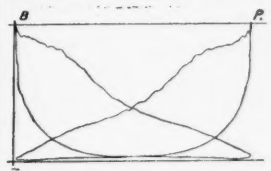
The Efficiency of Compound Locomotives.

BOSTON, May 20, 1895

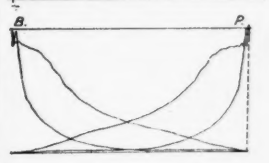
TO THE EDITOR OF THE RAILROAD GAZETTE:

There were some matters brought out at the recent meeting of the American Society of Mechanical Engineers when the subject of compound locomotives was discussed which I wish to notice, but did not then mention for fear of monopolizing too much of the time.

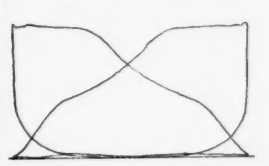
Mr. Vauclain's contention that balanced slide valves cannot be used for high pressures I do not agree with. This is merely a matter of detail, lubricant and lubrication Too many slide valve engines are running with 180 lbs. of steam, to support Mr. Vauclain's view, and the Paris, Lyons and Mediterranean Railway for years has been using slide valve locomotives carrying 213 lbs. I recollect reading several years ago that many locomotives in Switzerland carried 225 lbs. of steam. The appearance of piston valves on the North Eastern Railway of England is not evidence that American designs of balanced slide valves will not successfully work with the highest pressure of steam. It is well known that English locomotive superintendents do not use balanced valves, and that they do not in general use cast iron for that detail,

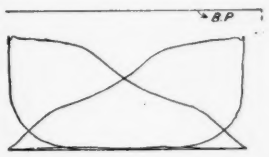


Nov. 12, south.
No. 7, left cylinder.
Spring, 100.
Steam, 161.
Cut-off, 7⅛ in.
Rev. per minute, 160.
M. E. P., front, 57.4.
M. E. P., back, 56.9.
H. P. of engine, 574.
Throttle wide.

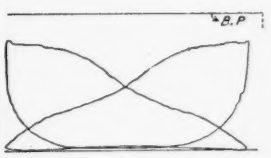


Nov. 12, south.
No. 9, left cylinder.
Spring, 100.
Steam, 145.
Cut-off, 4¼ in.
Rev. per minute, 228.
M. E. P., front, 33.4.
M. E. P., back, 31.2.
H. P. of engine, 460.
Throttle wide.

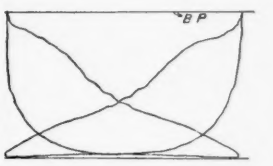

Nov. 12, south.
No. 21, left cylinder.
Spring, 100.
Steam, 162.
Rev. per minute, 52.
Cut-off, 10¼ in.
M. E. P., front, 97.5.
M. E. P., back, 95.5.
H. P. of engine, 306.
Throttle wide.



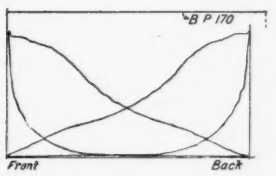
Nov. 12, south.
No. 22, left cylinder.
Spring, 100.
Steam, 164.
Cut-off, 10¼ in.
Rev. per minute, 96.
M. E. P., front, 75.7.
M. E. P., back, 76.2.
H. P. of engine, 454.
Throttle, ⅛ open.



Nov. 6, north.
No. 29, right cylinder.
Spring, 100.
Steam, 159.
Rev. Per minute, 155.
Cut-off, 10¼ in.
M. E. P., front, 69.
M. E. P., back, 69.
H. P. of engine, 641.
Throttle, ⅛ open.



Nov. 8, north.
No. 35, left cylinder.
Spring, 100.
Steam, 171.
Cut-off, 7½ in.
Rev. per minute, 176
M. E. P., front, 63.2.
M. E. P., back, 62.7.
H. P. of engine, 675.
Throttle, wide.



Nov. 11. north.
No. 56, right cylinder.
Spring, 100.
Steam, 170.
Rev. per minute, 140.
Cut-off, 7 in.
M. E. P., Front, 57.
M. E. P., back, 56.2.

Indicator Cards from Lauder Locomotive.

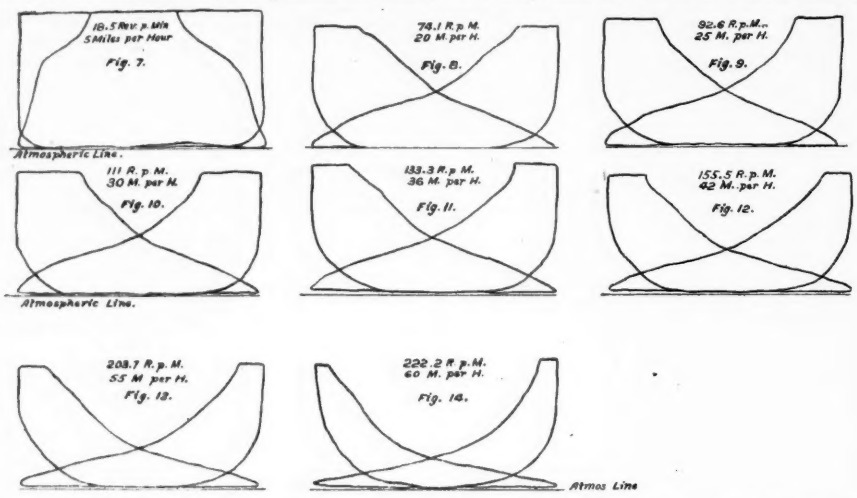
but, instead, use bronze. Nor do they use cylinder ports that begin to be large enough. It is not surprising, therefore, that piston valves should be tried on English locomotives when Englishmen so persistently refuse to follow good practice with slide valves. It will be interesting to see how long piston valves will be used on the North Eastern Railway.

The argument is generally made that, as piston rings work well in cylinders, why should they not be successful in valves? It is one thing for rings to work over ports, and with variable travel, and another for them to work in smooth uninterrupted cylinders and to have a constant travel. I have understood on pretty good authority that piston valve locomotives handle very hard. On reflection this appears probable, for the steam gets under the rings and forces them out. Now, if from this, or any other cause, the rings catch on the

edges of the ports, what will happen, and have not many piston valves come to grief in just this way?

Whatever may be said of the effect of high pressure steam upon valves it can only affect one valve of a two-cylinder compound, while it affects two of a four-cylinder compound.

Mr. Vauclain refers to indicator diagrams from the North Eastern locomotive as evidence of splendid action of the piston valve. No doubt he refers to the diagrams published in *Engineering*, Feb. 1, 1895. It is difficult to know which to be most surprised at—that the North Eastern locomotive superintendent should present these diagrams to a confiding public, or that Mr. Vauclain should refer to them; for a person familiar with the idiosyncrasies of indicators will see at a glance that the straight steam lines and sharp cut-off are due to a sticky indicator. I will ask you, Mr. Editor, to reproduce these diagrams with this letter; also one from a former letter of mine in the *Gazette* of June 20, 1890, and also several hat I took in 1889 from an Old Colony locomotive with



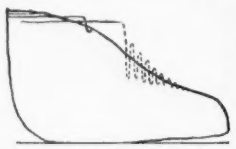
Indicator Cards from Express Locomotive Between Newcastle and Edinburgh, North-Eastern Railroad.

Load, 14 Coaches. Engine with Piston Valves. Single Drivers, 7 ft. 7 in. Cylinders, 19 in. Diam., 24 in. Stroke.

a free working indicator, the latter being selected to correspond in speed as nearly as possible with the North Eastern diagrams. The diagram from my former letter was originally published to show how an indicator may sometimes stick and then release itself. This diagram was taken from the first Strong locomotive on the Lehigh Valley Railroad in 1884 or 1885. The Old Colony diagrams were taken from a Lauder engine without the Allen port, and show almost as good lines as the piston valve. The second, fifth, sixth, seventh and eighth North Eastern diagrams give some idea of where the upper part of the expansion lines ought to be. The fact that at all speeds these diagrams have straight steam lines and sharp cut-offs is ample evidence of their untrustworthiness.

Coming to the quotation of the Locomotive Superintendent of the Hungarian State Railways as evidence against the two-cylinder and in favor of the four-cylinder compound locomotive, I have never seen much evidence that any European has appreciated the problem of designing an efficient compound locomotive, and I should give testimony from that source very little weight.

I do not feel that Mr. Vauclain's statement that his compound locomotive has used as little as 17½ lbs. of steam per I. H. P. per hour should go unchallenged. I believe that such a result for a non-condensing compound engine is impossible. When I published a result of a little over 19 lbs. some months ago for my own engine, I felt that I was claiming all there is in it, and some people thought that I had claimed more. If a person is not very particular with his water measurements, with taking the time the throttle is open, with his speeds, and with the scale of his indicator springs, he is hopelessly lost. Some time ago purchased two 50-lb. springs, but on testing them at the Brooklyn Navy Yard, one proved to be 48.98 lbs. and the other nearly 54 lbs.



From a Locomotive with a Sticky Indicator; Run Over Four Times.

To obviate the indicator spring difficulty it is necessary to number each spring and to keep a special reference book stating the number, actual scale, when and where tested and used, etc., etc. An experimenter who accepts springs as the maker sends them to him, and uses them indefinitely, as many do, will never obtain a single correct result in his whole experience.

I next wish to consider the effect of the bridges of piston valve ports on the loss of work between the cylinders of a four-cylinder compound. The steam in passing from the high-pressure cylinder to the valve, strikes the flat bridges, is deflected at right angles to its course, and this causes it to enter the valve chest at a reduced pressure. It then, on its way to the low pressure cylinder, strikes against more bridges, and is again deflected at right angles to its course, and finally enters the low pressure cylinder at a greatly reduced pressure. It is difficult to imagine anything more discouraging to steam than meeting such obstructions, and they remain no matter how large the port area may be. The effect is very plainly shown, if one arranges a series of diagrams from a four-cylinder piston valve engine in the order of speeds, by the increasing width of the space between the high pressure and low pressure diagrams as speed increases. What can cause this widening gap, but obstructions and deflections? For in this type of engine the lower line of the high pressure diagram and upper line of the low pressure diagram should coincide.

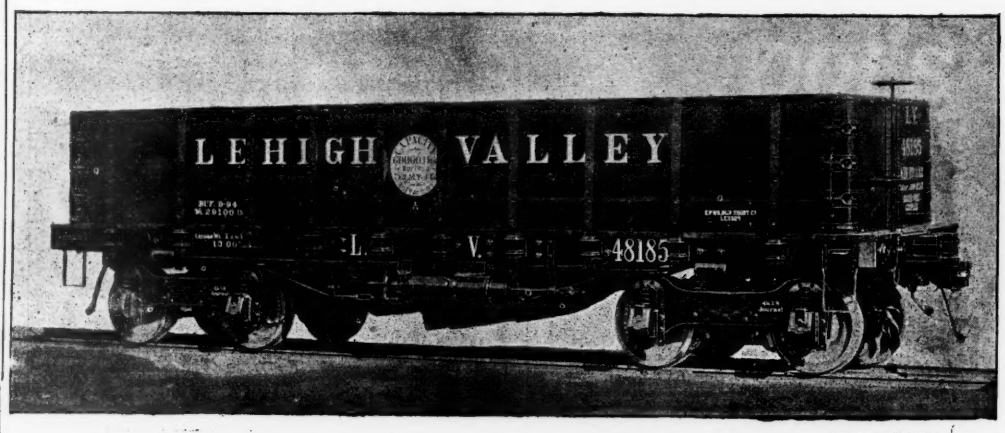
Mr. Vauclain criticises the cylinder ratios generally used in two-cylinder compounds. A ratio of 3 to 1 can be used in a two-cylinder compound as well as in any other, but of what use is this ratio if such engines have to be run with a cut-off of three-fourths stroke, as is the case generally with four-cylinder compounds? A two-cylinder compound, with a ratio of 2 to 1 and stroke of 24 in., can do almost all of its work on level and undulating lines with cut-offs of 10 and 8 in., and thus expand its steam, say $\frac{24}{10} \times 2 = 4.8$ times, while the other will expand its steam $\frac{24}{8} \times 3 = 4$ times.

If the cylinder ratio of 3 to 1 is obtained by using small high-pressure cylinders the engine has too small a range of power, and if by using large low-pressure cylinders the work of the back pressure is too great.

F. W. DEAN.

The Fox Truck on the Lehigh Valley.

A very good impression of the simplicity of the Fox truck is obtained from the illustration of the Lehigh Valley 60,000 lb. King hopper gondola car accompanying this article. These cars were built by the Buffalo Car Manufacturing Co. and have been very successful in handling material quickly. The Fox truck is quite as simple as it looks in the illustration. There are no bolsters or spring planks, and the number of parts are but a small fraction of those used in the common diamond truck, and the saving in weight is about 3,000 lbs. per car over the best type of diamond truck. The inspection of these trucks can be made in less than one-quarter of the time than for a diamond truck, as all parts are visible without crawling under the car. After some considerable inquiry we have not found a railroad company that has had repairs to make to the Fox truck frames, except in cases of wrecks. The parts are apparently so well riveted that they do not get loose, and do not, therefore, slide on each other so as to wear at the joints. We shall publish detailed engravings of this car later.



King Hopper Gondola With Fox Truck.

Built by the BUFFALO CAR MANUFACTURING CO., *for the* LEHIGH VALLEY RAILROAD.

The New York Railroad Construction Law.

As briefly announced in the *Railroad Gazette* last week, the Supreme Court of New York, General term, has confirmed the action of the State Railroad Commissioners in refusing a certificate of public convenience and necessity to the Directors of the Amsterdam, Johnstown & Gloversville Railroad Co., who desired to build a railroad from Amsterdam westward, parallel to the New York Central, about 10 miles, and then northward, parallel to the Fonda, Johnstown & Gloversville, a steam railroad, the Cayadutta Electric Railroad, and a horse railroad, to Gloversville, a total length of about 14 miles, as compared with 16 miles by the shortest of the other three routes. The Commissioners held that there was no necessity for a new road, and the present decision, delivered by Judge Herrick and concurred in by Judge Putnam, sustains them. Section 59 of chapter 676 of the laws of 1892, which covers this matter, expressly provides for submitting such questions to the Supreme Court if the Railroad Commissioners refuse to grant the desired certificate. The Court, quoting with approval a previous decision (New Hamburg Railroad, 76 Hun 76) holds:

This mode of proceeding, while it grants the Court power to review the action of Commissioners, plainly indicates that the Court is to treat the application as in the nature of a review of the decision of a subordinate tribunal, and not as it would an original application made to it in the first instance. The burden rests upon the petitioner to show affirmatively that the Commissioners erred in their determination, and the Commissioners should be credited with some technical knowledge which this Court is not presumed to possess. . . . Unless the Court can see that the decision of the Board of Railroad Commissioners was founded upon erroneous legal principles, or that it proceeded contrary to the clear weight of evidence in arriving at its conclusion upon any question of fact, or that it has abused the discretion vested in it, and has arbitrarily refused to issue the necessary certificate, I do not think that the Court should reverse its determination, and compel it to issue a certificate. The Railroad Commissioners supervise the railroads of the state and they are presumably well-informed on all the questions connected with railroad transportation throughout the state; and their opinion is entitled to respect and consideration.

Petitions for and against the new road were presented signed by hundreds of people, but no facts were given except the general statement that transportation charges on the existing railroads were too high. It appears that the new road would have to make its eastern terminus some three miles west of Amsterdam, and the cars could reach the center of that city only by means of an existing electric street railroad. The opinion continues:

Local sentiment aroused by the alleged misuse or abuse of an existing franchise affords no sufficient reason for granting another franchise. There is no evidence that the existing railroads could not carry all the freight and passengers. . . . The privilege of constructing and operating a railroad is not one that exists in the incorporators as a common right, it is a privilege or franchise that is granted by the state, and can only be obtained by complying with the laws adopted by the state regulating the granting of such franchises. The law, section 59, was evidently intended to restrict the building of roads not actually needed, in order to protect, not only existing railroads, but also citizens from investing in alluring but profitless enterprises. The propriety and necessity of constructing a road was not left to be determined by enterprising but perhaps ill-informed or ill-advised citizens, or by those seeking by threats of destructive competition to levy tribute upon existing roads, but was placed in the hands of accredited officers of the state, who should act for and in its behalf in determining whether the interests of the state, and of the community immediately affected would be promoted by the building of a road.

Provisions had theretofore been made, to be hereafter referred to, for the correction of abuses in the management of roads already constructed so that it was no longer necessary to correct evils in the management of existing roads by constructing a competing one.

A corporation applying for a certificate is not entitled to it as a matter of right in the event of no one appearing to oppose its application; nor if any one does appear in opposition, is he obliged to prove a negative, and convince the board that public convenience and necessity do not require the construction of the road. The burden of proof is upon the applicant to establish the existence of that condition of affairs which will authorize the granting of a franchise. . . . To guide them, where it is claimed existing roads do not afford the necessary facilities, the commissioners may properly take into consideration the means that the law affords to regulate the management of railroad corporations, and correct mismanagement and enforce the providing of proper service. . . . The Commissioners were abundantly justified in finding that the road was not needed and they have not abused their discretion.

The claim was made that the principle company now serving this territory has recently declared a dividend of 8 per cent. and has a surplus in its treasury. Without inquiring into the truth of such claims, nor for how long a time the existing company has been running and declaring dividends upon its stock; or whether the original investors have from the time of the commencement of their road down to the present time received reasonable returns for their investments, but, for the purposes of this case, assuming that their charges are under all the circumstances unreasonable, that was not a sufficient reason for certifying that public convenience and necessity required the construction of the road. The charging of exorbitant rates does not in the present state of

the law, make a case for the building of another road. Such charges may indicate either that there is insufficient business to support the roads with lesser charges, or it may indicate bad management and a grasping disposition on the part of their operators.

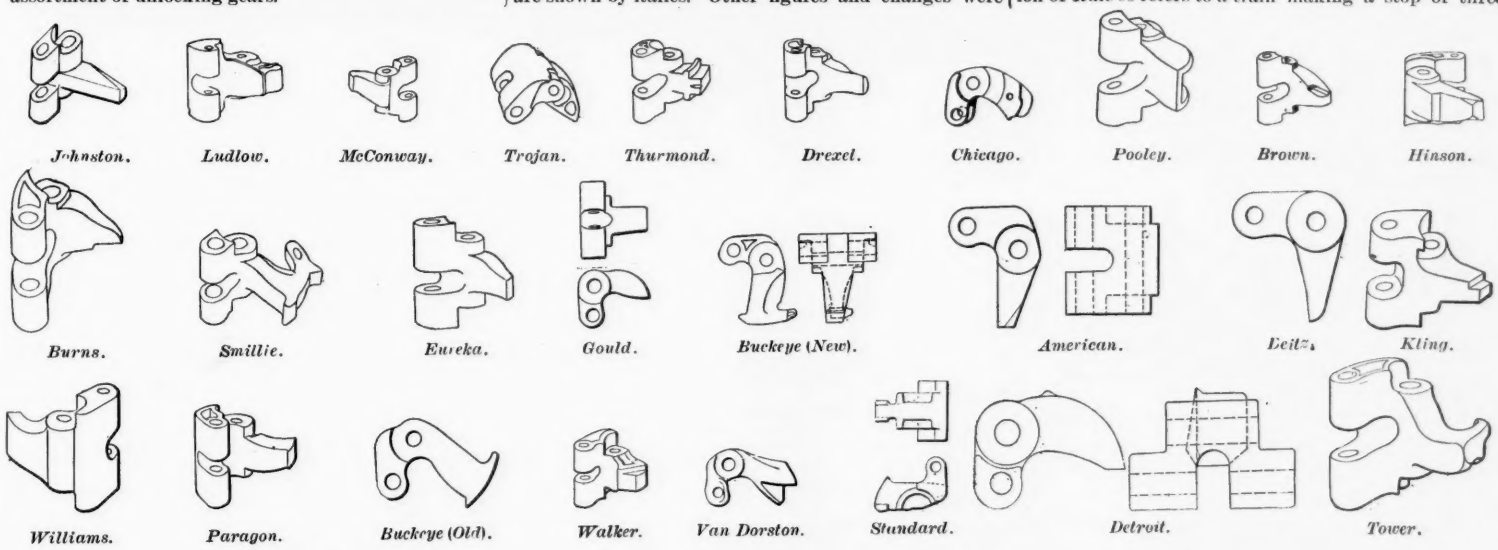
The remedy for high charges is to apply for a reduction of rates. Section 161, chapter 565, laws of 1890, authorizes the Railroad Commissioners to examine rates for freight and passengers, and if they deem a change reasonable and expedient to notify the railroad company to that effect; if the road refuses, the Commissioners are to certify the fact to the Attorney General; and section 162, amended in 1892, provides that a special term of the Supreme Court may compel compliance with the recommendations of the Commissioners, subject to appeal to the General Term and to the Court of Appeals. These provisions afford a sufficient remedy for the alleged grievance in the present case.

The Court must assume that the Railroad Commission will do its duty in the premises, and upon its being made to appear to it, that the existing railroads are charging unnecessarily high rates fer transportation, that it will recommend their reduction. And it must also be assumed that the Attorney General will do his duty, and present the Board's recommendation to the Court, in the event of the railroads refusing to comply with it; and upon its being so presented, the Court will endeavor to do its duty in the premises.

The application is denied with costs.

M. C. B. Coupler Knuckles Now in Use.

Two or three years ago the Secretary of the Master Car Builders' Association said that the Association had no standard coupler. At that time many thought there was a standard, but now it is quite clear that there is none; and no further evidence is needed than the array of knuckles here illustrated. These are only a part of the great variety, and yet for each of these knuckles there is a corresponding lock and head and there is a fine assortment of unlocking gears.



A Few M. C. B. Knuckles.

No two of these knuckles are intended to be duplicates, and if a knuckle is broken and there does not happen to be one of the same dimensions in stock, the whole drawbar and lock must be removed and another substituted. In many cases the unlocking gear must be removed also and a different one put on. Even a broken lock will cause the removal of the entire coupler if one is not to be found in stock, and often the unlocking gear must be changed to suit the substituted coupler. In this way, a part that cost less than one dollar to make may be the means of causing the removal of nine or ten dollars worth of material. Of course, under the present Rules of Interchange, the coupler so removed may be put in stock, and when repaired be put in the place of any other broken coupler, but meanwhile the broken part must be ordered and the part fitted in. Some of the companies making couplers have various dimensions for parts having the same general shape, so that there is liable to be a mistake either in ordering or in filling the order.

Under the new proposed modification of the Rules, the coupler may be removed as under the present Rules, but now the road removing the coupler because of breakage, generally has to pay for the new coupler that is substituted, while the new Rules contemplate charging to the owner of the car the cost of such breakages as do not occur in wrecks or are not accompanied by other serious damage to end sills, etc.

As many and as interesting a lot of different locks, heads, and unlocking gears could be shown if it were necessary to emphasize the fact that there is no standard M. C. B. coupler, and little or no interchangeability of parts among couplers now sold to the railroads. The standard parts of the coupler are the size of the shank and the contour lines, which regulate the coupling together and the substitution of one whole coupler for another. If the number of designs were now to stop increasing, that the test of service might show, by the "survival of the fittest," what is best and so reduce the number of types, the condition would not be so serious. But the number of types is increasing and there is now no limit to the increase. Any enterprising foundry can get up its own bar and most of them that have railroad customers are doing so.

The problem is how to stop the increase, which has gone on until the number of parts, such as knuckles, bars, locks and unlocking gears, that must be kept in stock for a full equipment is greater than was the case a few years ago when the link and bar varieties caused so much annoyance. In the case of the link bars, however, the shanks varied and that made a worse trouble, for there was no way of putting a long bar in the place of a short one. Now, the new M. C. B. type of bar is more expensive and private car companies and railroads cannot afford to pay for a whole drawbar and unlocking gear to be put in when a lock breaks. It is not known at this writing whether the M. C. B. Association will take up this question next week at Alexandria Bay, but that it must be disposed of soon is evident.

Train Rule No. 99.

BY J. A. ANDERSON.

Of the train rules, in the Uniform Code, prepared by the American Railway Association, few, if any, have been the subject of so much criticism as Nos. 96, 97 and 99. These rules, which are herewith given, have special reference to the protection of trains from others moving in the same direction, although providing for like protection in front, when necessary. They are nearly identical with similar rules in use on the Pennsylvania Railroad prior to the adoption of the Uniform Code for that road. The manner in which the blanks were filled upon such adoption, and some slight modifications by that company, are shown by italics. Other figures and changes were adopted for other roads, but this sufficiently illustrates the consideration of the subject.

Rule 96. When a passenger train is detained at any of its usual stops (*at a timetable stop*), more than *three* minutes, the flagman must go back with danger signals and protect his train, as provided in Rule No. 99; but, if it stops at any unusual (*other*) point, the flagman must immediately go back far enough to be seen from a train moving in the same direction when it is at least 900 *yards* from the rear of his own train, and, if the stop is over *one* minute, he must be governed by Rule No. 99.

When it is necessary to protect the front of the train, the same precautions must be observed by the fireman. If the fireman is unable to leave the engine, the front brakeman must be sent in his place.

Rule 97. When a freight train is detained at any of its usual stops more than —— minutes,* where the rear of the train can be plainly seen from a train moving in the same direction at a distance of at least 900 *yards*, the flagman must go back with danger signals not less than 100 *yards*, and as much farther as may be necessary to protect his train; but if the rear of the train cannot be plainly seen at a distance of at least 900 *yards*, or if it stops at any point that is not its usual stopping place (P. R. R. omits "or if" to "place" inclusive), the flagman must go back not less than 900 *yards*, and if his train should be detained until within ten (*five*) minutes of the time of a passenger train moving in the same direction, he must be governed by Rule No. 99.

(Then follows the same provision as in Rule No. 96 for protecting the front.)

Rule 99. When a train is stopped by an accident or obstruction, the flagman must immediately go back with danger signals to stop any train moving in the same direction. At a point 600 *yards* from the rear of his train he must place one torpedo on the rail; he must then continue to go back *to a point* at least 1,200 *yards* from the rear of his train, and place two torpedoes on the rail, ten yards apart (one rail length), when he may (*must*) return to a point 900 *yards* from the rear of his train, and he must remain there (*where he must remain*) until recalled by the whistle of his engine; but, if a passenger train is due within ten (*five*) minutes, he must remain until it arrives. When he comes in, he will remove the torpedoes nearest to the train, but the two torpedoes must be left on the rail as a caution signal to any following train.

(Here is added a paragraph relating to the protection of the front of the train in the same way when necessary.)

The following is the new Rule 99, designed to take the place of the three foregoing, with Rule 30 as altered to conform to the recommendation as to the use of torpedoes:

Rule 99. When a train stops or is delayed, under circumstances in which it may be overtaken by a following train, the flagman must go back immediately with danger signals a sufficient distance to insure full protection. When recalled he may return to his train, first placing two torpedoes on the rail, when the conditions require it.

The front of a train must be protected in the same way, when necessary, by the fireman.

Rule 30. An explosive cap or torpedo placed on the top of the rail is a signal to be used in addition to the regular signals. The explosion of one torpedo is a signal to stop; the explosion of two torpedoes *not more than 200 ft. apart* is a signal to reduce speed and look out for a danger signal.

Rule 96 relates exclusively to passenger trains, and Rule 97 to freight trains, each requiring in certain contingencies the use of the methods prescribed in Rule 99, which, primarily, has reference to protection in case of accidents and obstructions. In their construction, past usage was followed in stating with great particularity the exact times and distances that were to govern in carrying out the object of the rules. In undertaking to fix these, however, great diversity of views became apparent. This arose inevitably from the different circumstances existing on different roads, and the necessity for differences in practice were so plain that blanks were left for each company to fill at its discretion. The attempt to fill these blanks brought out quite clearly on many roads. If not on all, that the circumstances on each were such that no one set of detailed instructions on these points would fit all cases. On branches worked by one crew or on up grades, or when the view was clear for long distances, it might not be necessary to go back as far as might be prescribed; or, perhaps, not at all; while on heavy down grades, or where fast speeds prevailed, still greater distances might be needed than such as might seem best for a general rule. It is also to be observed that the rules made no provision for the protection of a train delayed but still moving, this being necessarily left to the judgment of those in charge.

The times and distances which each road might adopt were at best but estimates of what might be proper and there is some uncertainty as to whether the first provision of Rule 96 refers to a train making a stop of three minutes when on time, or to a train that is "detained" a given number of minutes behind its time. It was evident, too, that rules that undertook to provide in this way for *all* cases must stipulate the greatest distance that was supposed to be needed in *any* case and thus require the extreme of precaution for cases needing less or none.

The attempt at general adoption brought out strongly the impracticability of the rules, as framed, for universal use, and there was a general demand for some modification, even from those who had adopted them with the sincere intention of faithfully carrying them out. This demand brought them before the Committee on Rules of the Association, the chairman of which occupied a like position in connection with the Pennsylvania Railroad, and the subject was taken up simultaneously in both committees.

The conditions on the Pennsylvania were sufficiently diverse to show that any rule that would apply satisfactorily to all its lines would probably prove generally acceptable. For a period of two years close attention was given to the subject, with frequent reports of suggested modifications, each finding many who could not accept them. It was finally thought best to recommend that these, and possibly other rules hereafter, be so arranged as to provide the general principle that should govern in the matter in question, leaving each road to supply details by special instructions or by addenda to the rules fitting particular cases. This is really in accord with the method adopted in the original rules, which left particulars to be supplied according to individual requirements, but which plan, unfortunately, was not carried out far enough.

When this idea became impressed upon those having the matter in charge the task was at once freed from much of its difficulty. The outcome was the new Rule No. 99, quoted above, which was adopted at the meeting of the association in St. Louis last April, to take the place of the present Rules 96, 97 and 99. This undertakes to establish a general rule for *all* trains under all circumstances in which protection is required. It requires that all must be absolutely protected. It points out the general *manner* of protection and that it must be *immediate* on the necessity arising. The *extent* of protection is left to the conditions in each case, as, in fact, it

* Here the P. R. R. rule is much briefer and reads: "When a freight train stops where the rear of," etc.

is in some cases in the present rules. The responsibility of fully protecting a train is placed upon its men, where it now is, and, in fact, must be. Under this rule they cannot idly follow out a detailed programme and claim that they have done their full duty. The provisions apply to all trains and all circumstances and are imperative. The flagman, who is to use the signals, is under the direction of the conductor, whose business it is to see htat all on the train perform their duties properly, and he, in turn, is to be found by the superintending officer to be competent for this duty and to fully understand it before he is entrusted with it.

The new rule is definite and emphatic as to the essential principle, and contains nothing but what should be the rule on every road; and, in leaving details to the "discretion" of the trainmen, does what the old rules do in terms to a certain extent, and what is absolutely necessary in this and many other operations involving safety of life and property, where dependence must be placed on the character and training of those employed.

In the discussion of this subject by the associated officers of the Pennsylvania Railroad, nothing was found that met with anything like general approval until the plan now adopted was presented. This proved acceptable to all, including general officers of long experience who had aided in formulating earlier rules, and who now believe that the day has passed when these detailed provisions are necessary, even if practicable.

The St. Louis convention occurred shortly after the approval by his own company, of the rule presented by the Chairman of the Rule Committee, and it was found that explanations there given met with such approval that the convention adopted the rule by an overwhelming vote.

The committee, and those whom they represent in both connections, sought first, *safety;* second, *convenience of working;* and it is believed that both are attained, without sacrificing uniformity in essential principles and methods.

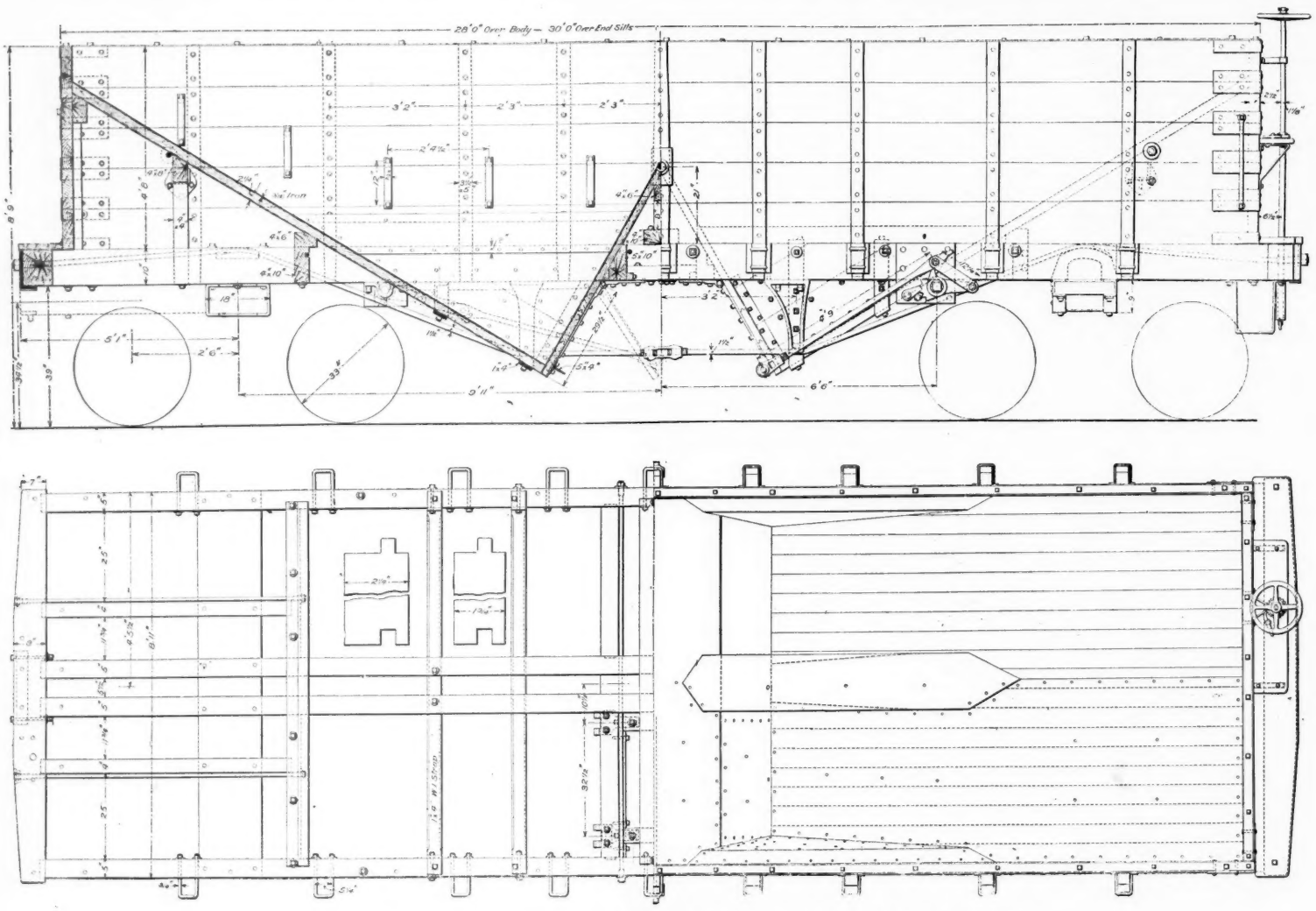
Much might be said upon the diverse conditions under which this special rule is to be applied, and showing further why the present rules are impracticable; but railroad men sufficiently understand this, and they cannot but feel that in the formation of the rule a decided advance has been made, the principal of which may well be applied to the reconstruction of others.

In connection with the *method* of protection it is to be observed that the reference here to the use of torpedoes, in connection with a change in rule 30, indicates a change in this respect.

The writer will only add that for information as to points mentioned above, which did not come under his personal notice, he is indebted to the able Chairman of the Committee on Train Rules of the American Railway Association.

A 77,000-lb. Gondola.

The engravings show in considerable detail a gondola car recently built at Fort Wayne from the designs of Mr. G. L. Potter, Superintendent of Motive Power, Northwest system, Pennsylvania lines west of Pittsburgh. The engravings show the car in general and details of the truck and the arrangement of the air-brake.



Plan and section of Heavy, Hopper Bottom Gondola Car—Pennsylvania Lines West of Pittsburgh.

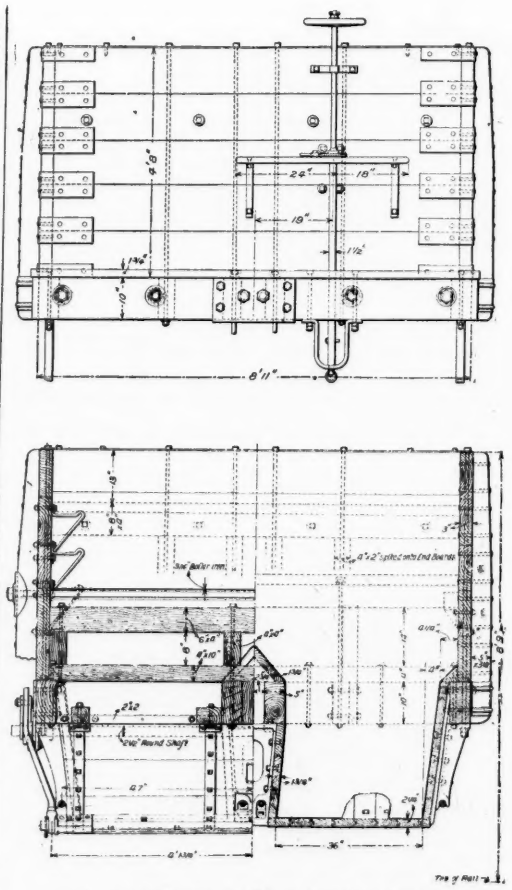
The marked capacity of these cars is 70-000 lbs., which will permit of their being loaded to 77,000. The weight will be about 34,000 or 35,000 lbs. The car is designed to be self-unloading, and the sample car built at the Fort Wayne shops is very satisfactory in this respect, especially when loaded with coal. It was unloaded in from one-half to three-fourths of a minute.

The car is 30 ft. long over all, the body 28 ft. It is 8 ft. 11 in. wide over side sills, 19 ft. 10 in. long between centers of bolsters. The truck wheel base is 5 ft. The journals are 4¼ in. × 8 in. The diameter of the axle at the middle is not shown on the drawings.

Doubtless this heavy truck will be interesting to the master car builders in view of the necessity for greater capacity which is always being felt. Perhaps it would be well now to select a standard 80,000-lb. axle, so that in the time to come there will not be several standards, as there are now with the 60,000-lb. axle. With a new 80,000-lb. standard it may be possible to get a standard coil spring for the truck, as was recommended by the Southwestern Railway Club. If this can be fixed upon there would be a saving in repairs, and if the range of motion can be made greater than with present springs there will be fewer broken springs and fewer cracked and broken journals. The newer forms of trucks and bolsters are stiffer, and when the springs close the axles are more strained and the springs receive a more violent blow. There may not be many 80,000-lb. capacity cars built in the near future, but a standard axle for such cars would tend to keep down the variations in dimensions in those that are built.

The Hudson River Bridge.

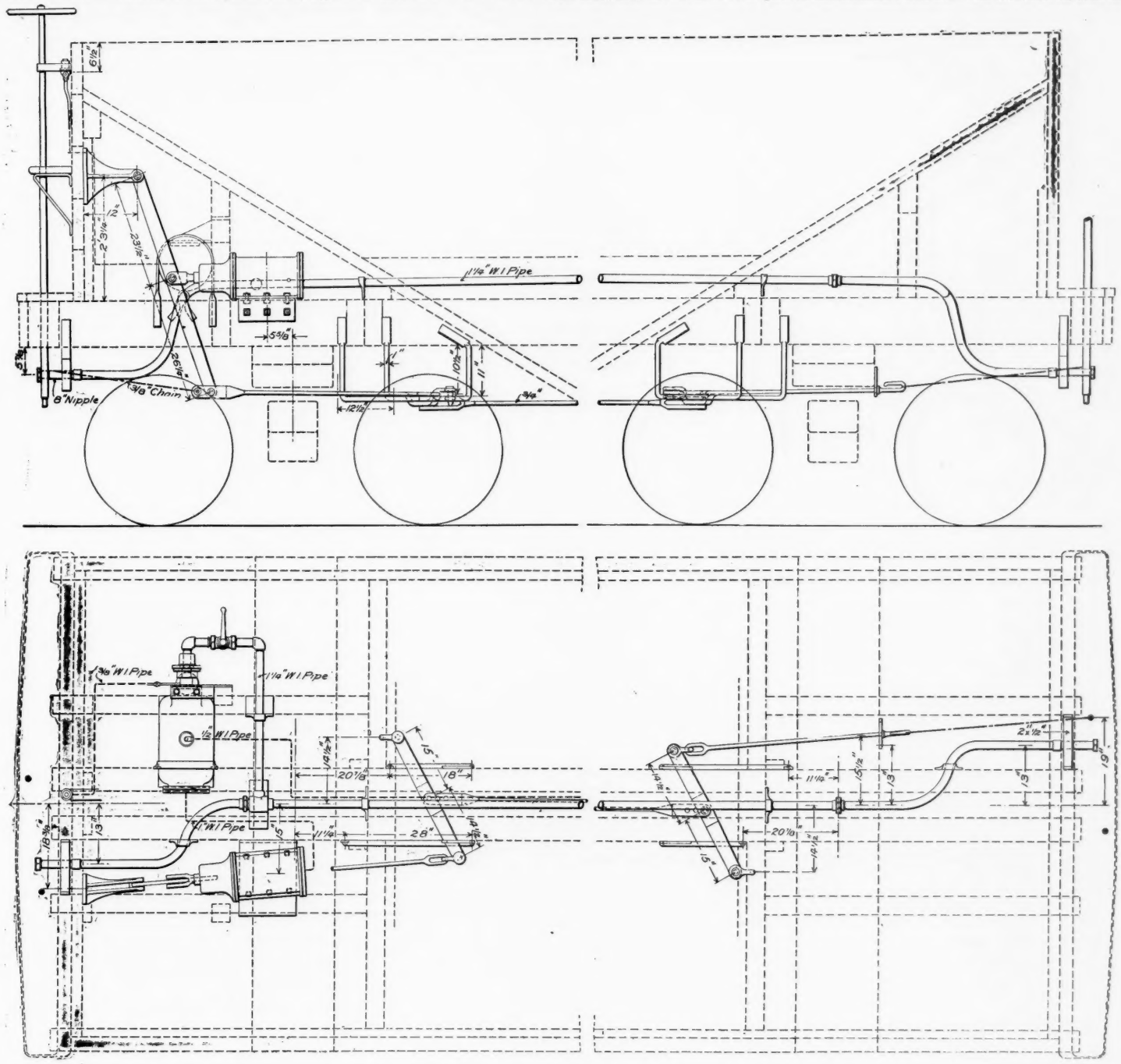
The New York & New Jersey State Bridge Commission formally accepted, June 4, the plan for a bridge across the Hudson River, offered by the Union Bridge Company. The plans for the bridge were prepared by Mr. Macdonald, and provide for a suspension bridge with a center-hinged, stiffening truss, the cost guaranteed by the company not to exceed $25,000,000. The bridge is described by Mr. Macdonald as follows: It is to span the river without any support between the pier-head line on either shore; to have a clear opening of 3,110 feet, and a height at the center of 150 feet in the clear above high water, with the grade running downward from that point on the New York side 35 feet to the mile. There will be six tracks on a level, designed to carry 3,000 pounds per lineal foot on each track, with excess for engine loading. These trusses are of the bow-string order, with an extreme height of 200 feet. They are spaced 125 feet apart. center to center, and are designed to be erected by pin connections throughout; and, after the erection is completed, the joints are to be riveted so as to provide for reversal of strains.



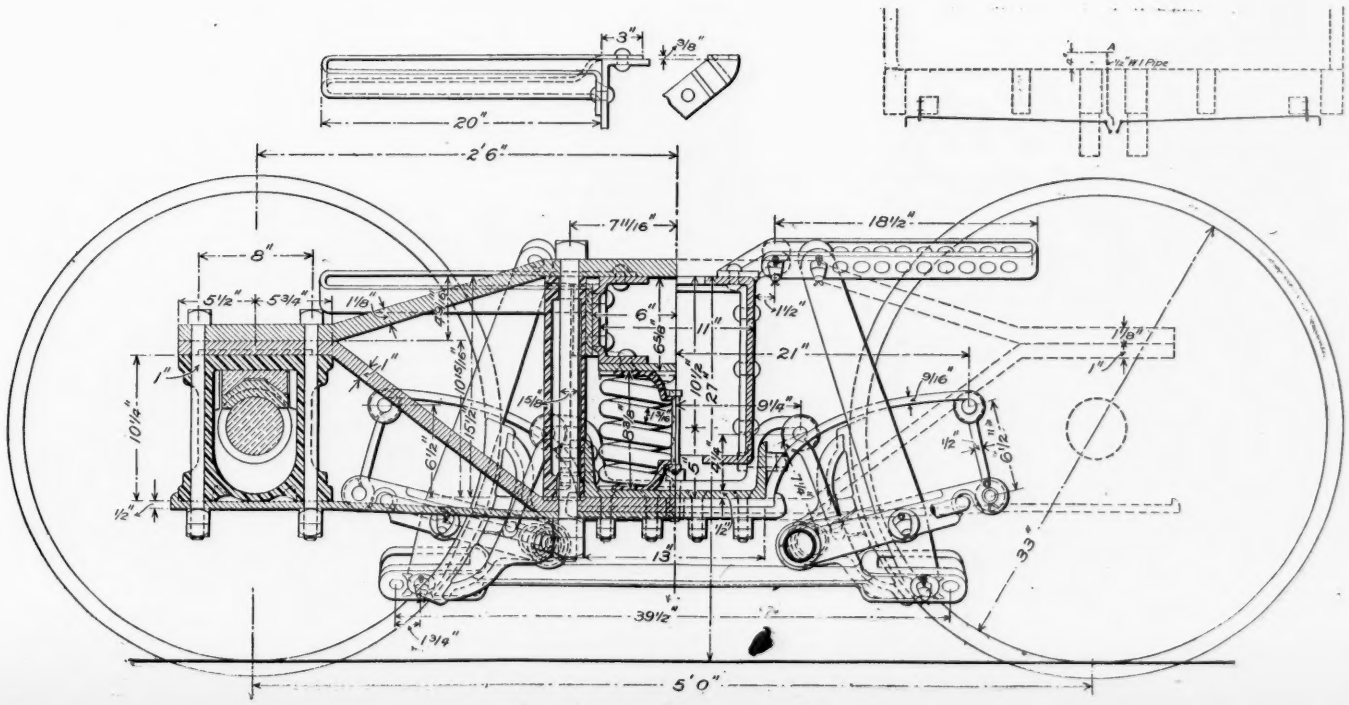
End and Sectional Views, Gondola Car.

The cables sustaining the roadway are 12 in number two on either side of the stiffening trusses, and four between the trusses; arranged so as to divide the cross-

floorbeams into three equal lengths. Suspenders from these intermediate cables connect with a cross truss at each panel, thus securing a rigid connection with the stiffening trusses. A system of lateral bracing at the floor level is provided, to resist the wind pressure which is not taken directly by the cables. There is also a vertical set of vibration bracing at each panel point, together with top chord lateral bracing. The cables are in vertical planes purposely without cradling; as we have found that they offer, in this position, as much resistance to displacement by wind as with any practicable system of cradling. The cables are attached rigidly to the towers, without roller shoes; due provision being made for this condition. On the New York side, they are secured to a masonry anchorage through tunnels, and are open to inspection throughout their entire length. On the New Jersey side, the anchorage will be in the solid rock: also provided with tunnels for inspection. The material for the cables and suspenders will be wire, of 180,000 lbs. ultimate resistance per square inch, and of the most approved manufacture known. The diameter of each cable



General Arrangement of Air Brakes—Heavy Gondola Car.



General Plan of Truck—Heavy Gondola Car.

is 23 in. The two main towers have eight legs, braced in two directions and resting upon six masonry piers founded upon the rock. These towers are 587 ft. in height, above high water; and are purposely designed so as to resist the bending strain due to changes of length of the cable, under variations of temperature. The New York approach consists of one deck span 400 ft. long, extending back to the bulkhead line, and one deck span 575 ft. long crossing over the New York Central tracks. From the New York anchorage, eastward, the tracks would occupy a space 100 ft. wide, on the north side of Sixty-eighth street. The approach on the New Jersey side is made up of short deck spans.

A meeting of the New York and New Jersey Bridge Company, of New York, was held immediately after the Commission had adjourned, and the plans of Mr. Macdonald were formally adopted. A letter was then sent to the Secretary of War, containing the description of the plans and declaring that the plan adopted was the only one which came within the specifications of Theodore Cooper, Consulting Engineer of the Bridge Commission.

It appears that certain interests in the bridge companies have already filed with the Secretary of War the plan prepared by Mr. Morison, which was submitted some days earlier.

The following extract from a letter from Mr. Cooper to the Commission is of interest:

"I would recommend that the commission for the present limit its approval to a general plan, such as would also be acceptable by the Secretary of War, as in accordance with the act of Congress. This will leave further time for a careful examination of the detail plans, which will determine the final character of the proposed bridge.

"I do not believe the capacity and strength of this structure should be left to the individual views of the several proposers. A bridge that will not meet the demands of the railroads which will connect with it or any future demands of the traffic of the City of New York would be a failure. That the present methods of handling freight upon the Island of Manhattan will be supplanted at some future time by some better system is undoubted, and, in my opinion, the completion of a satisfactory bridge over the Hudson River will go far to hasten its accomplishment. It would, therefore, be well for the New York Bridge Commission to exercise its powers in fixing the minimum capacity and strength of the proposed bridge.

"Personally, I have incorporated my own views upon these subjects in the general specifications which I prepared for the New York and New Jersey Bridge Companies Whether these views should govern my report upon the plans now before me is a proper matter for the commission to determine."

The Master Car Builders' Rules of Interchange.

BY J. N. BARR, *Supt. M. P., C., M, & St. P. Ry.*

The Master Car Builders' Association has made its influence felt more widely than any other railroad association. It deals with questions with which its members in general are personally and intimately familiar. Its adoption of standards has done much to facilitate the movement of cars, and to reduce the cost of maintaining cars in repair. Its members can well look back with pride on the part this Association has played in practical railroad affairs. There is nothing of which they should feel greater pride than of the adoption of a set of rules governing the Interchange of Freight Cars. Its adoption of definite prices for labor and material, and definite amounts of labor for many classes of repairs has shut off endless disputes which would otherwise arise in the settlement of bills. Its provision of the defect card has done much to prevent delays to freight. Its rules and regulations on the subject of defects has done much to secure a uniform inspection throughout the United States.

Notwithstanding all this, a sentiment has been growing for the past four or five years that delay to freight is becoming more frequent and more serious at interchange points and that inspection at interchange points is doing much to unnecessarily increase the cost of car repairs.

A careful study of the Rules of Exchange as they exist at present, being the rules as revised at Saratoga in June, 1894, will go far toward explaining a portion of the difficulty, especially if these rules are compared with the rules of 10 years ago or the rules as revised at Saratoga on June 10, 1884.

The rules of 1894 may be divided into seven sections as follows:

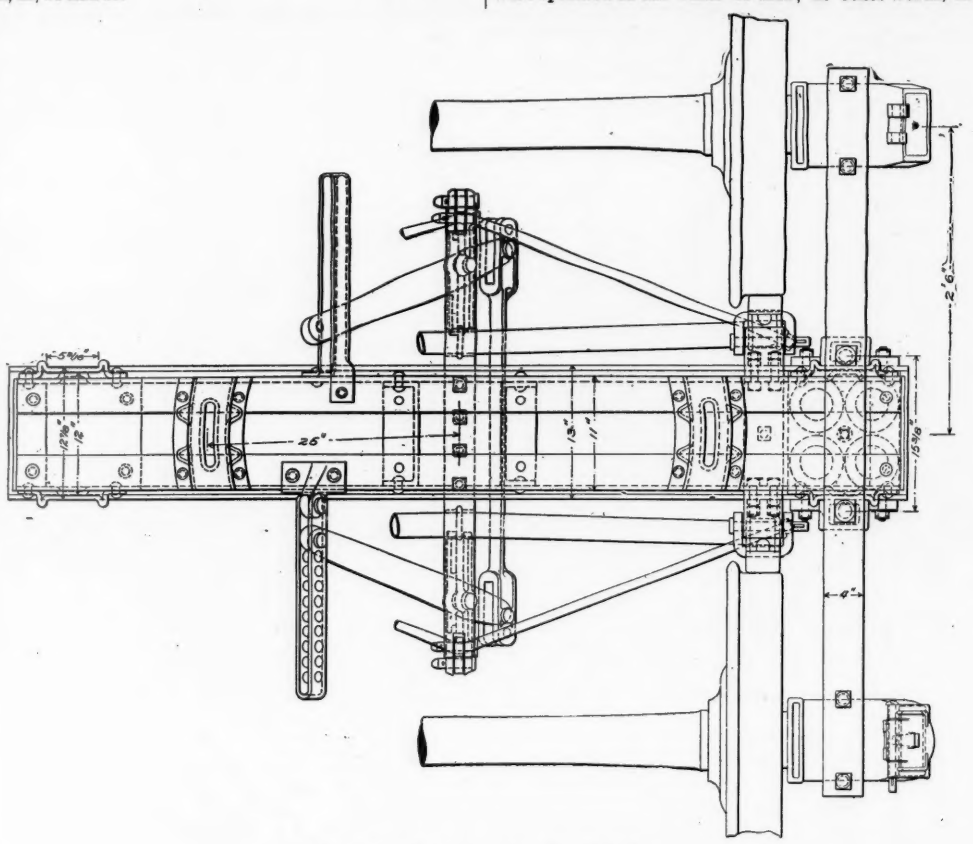
1. Care of Foreign Cars, Rule 1.
2. Interchanging Cars, Rules 2 and 3.
3. Defect Cards, Rules 4, 5 and 6.
4. Owners' Responsibility, Rules 7, 8 and 9.
5. Bills and Prices for Labor and Material, Rules, 12, 13, 14, 15, 23, 26 and 27.
6. Repairs of Foreign Cars, Rules 15, 16, 17, 18, 19, 20, 21, 22, 24 and 25.
7. Miscellaneous, Rules 10, 11, 28, 29, 30, 31 and 32.

The first section on the care of foreign cars requires that each railroad company shall give to foreign cars while on its own line the same care as to oiling and packing that it gives to its own cars. The entire space devoted to the care of foreign cars is covered by Rule 1 In the rules of 1884, Rule 9 was devoted to this same subject, and is almost the same except that at this time it was required that each road should give to foreign cars while on its own road the same care as to repairs, oiling and packing that it gives to its own cars, and shall return them in as good condition as they were when received. This rule also makes some exceptions for which owners shall be responsible, which are now embodied in Rules 7, 8 and 9.

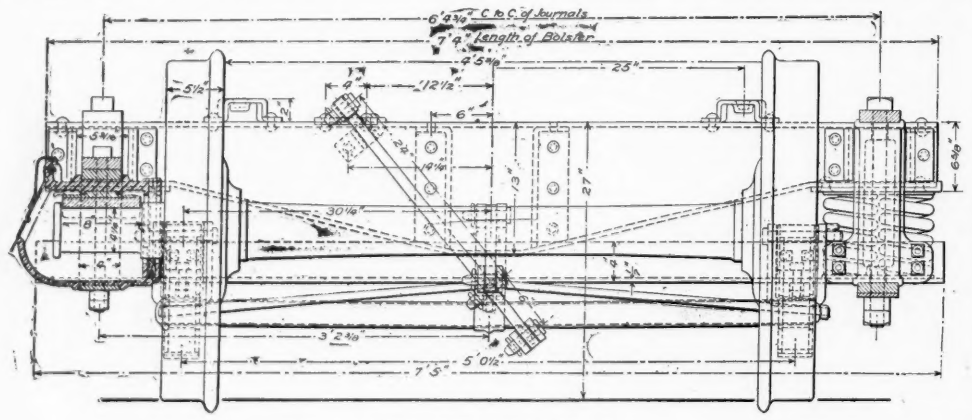
The position which the rules of 1894 take on these points is virtually the same as it was in 1884.

Under the second sub-division—that is, rules regulating interchange of cars, and which is covered by Rules 2 and 3 of 1894—the case is very different. Rule 2 of 1894 requires that cars must be delivered in good running order and returned in as good running condition as when received. The rules of 1884 are virtually the same in this respect.

Rule 3 specifies the defects for which cars may be refused. In comparing the rules of 1894 with those of 1884 a remarkable change will be noticed. In the rules of 1884 one page is considered sufficient to specify the defects for which cars may be refused. In the rules of 1894 a space of 16 pages is required for the same purpose, in other words, since 1884 the Master Car Builders' Association has gradually been increasing the list of defects for which cars may be refused at interchange points, and has virtually been increasing by this elaboration, the difficulties in the way of free interchange of cars, and it looks very much as if this elaboration is the cause of the complaints now so prevalant that delays to cars at interchange points are becoming unnecessarily and annoyingly frequent. The rules of 1894 as mentioned above occupy about 16 times as much space in the rules of interchange as they did in 1884, and making allowance for illustrations, it is a safe estimate to say that about 10 times as many items are specified in the rules of 1894 as were specified in the rules of 1884; in other words, the rules of 1894 specify 10 items in accordance with which inspectors may or should refuse cars, as compared with those of 10 years ago.



Details of Truck Construction—Gondola Car.



General Plan of Truck—Gondola Car.

The third section of M. C. B. Rules, covered by Rules 4 5 and 6, refers to the use of defect cards and is to all intents and purposes the same as the rules of 10 years ago.

Section 4 of the rules, regulating owners responsibility, and covered by Rules 7, 8 and 9 of the Rules of 1894, shows a decided increase as compared with the rules of 10 years ago, and indicates a tendency which has been growing for a number of years past to make owners responsible for a larger number of defects than heretofore. The increase in scope of this section has undoubtedly resulted from an endeavor on the part of the members of the M. C. B. Association to reduce the tendency to delays at interchange points, and to a certain extent that object in this respect has been attained.

Section 5, which regulates the manner of making bills and prices to be charged for labor and material, and which is covered by Rules 12, 13, 14, 23, 26 and 27, has been considerably elaborated, and it is generally conceded by all that there has been an improvement in this respect in avoiding disputes and securing uniformity in bills rendered between the different roads.

Section 6 covered by Rules 15, 16, 17, 18, 19 and 20, regulates the manner in which repairs should be made on foreign roads and is virtually the same as those of 10 years ago.

Section 7 covers a number of miscellaneous items as given in Rules 10, 11, 28, 29, 30, 31 and 32. These rules are nearly the same as they were 10 years ago, with the exception of one important addition covered by Rule 30 of 1894 rules, which provides for a committee to settle disputes arising under the rules. This has been an important and very satisfactory addition to the rules.

From the above it will be seen that the material changes in the rules in the past 10 years are confined almost exclusively to Section 2 on the Interchange of Cars, and Section 4, the exceptions for which car owners are responsible.

The whole basis of the M. C. B. Rules of Interchange really rests on Rule 2, which specifies that cars must be delivered in good running order, and returned in as good general condition as when received. This means that if a road has a foreign car in its possession it is responsible for the cost of repairs to any defects which an inspector may be able to find on the car, and that when a road receives a foreign car it assumes responsibility as above. The result of this condition of affairs is that every foreign car received by a road must be thoroughly inspected in all respects, and if there are any defects existing as specified in Rule 3, a card releasing the road from responsibility must be required of the delivering road for the protection of the receiving road.

Rule 3 enumerates 87 items for which cars may be refused, or for which cards may be required to protect the receiving road and necessitates for the protection of railroads a force of inspectors sufficient to inspect a car with reference to every one of these 87 items. The mere matter of inspection in itself is a serious cause of delay

at interchange points, and in order to avoid the burden railroads at present resort to various devices in order to escape the same.

In various sections of the country agreements have been made between roads having a large intercharge of cars, allowing the receiving road to bill against the owner of the car for very many defects for which the rules do not provide. At other points inspectors are required to make systematic book record of all defects on foreign cars received, and in case a receiving road should be compelled to furnish a card, or make repairs on any of the defects recorded, the delivering road agrees to furnish a defect card. Nearly all roads have a rule in force requiring their inspectors to remove defect cards which they issued when cars return to the line issuing the card. This would indicate that many cards are issued, not because the condition of the car requires it, but because the receiving road requires a card as a protection against being charged for repairs of minor defects for which they are in no way responsible.

Many roads refuse entirely to card for old defects on foreign cars. This is in direct violation of the M. C. B. rules. It would seem that there should be some modification of the rules to meet this condition of affairs.

Rule 2, requiring cars to be returned in as good general condition as when received, was possibly a perfectly satisfactory rule 15 or 20 years ago when these rules were first put in force, and when the interchange of cars was entirely different from the present. At that time a car would pass from a road to which it belonged to some other road, and in general returned in the same way as it went. At the present time a car may leave New York and go to San Francisco by one route and return by another route, passing in its trip 20 or 30 interchange points. At each of these points, under the present rules, a complete and exhaustive inspection of the car is required. This, as will readily be seen, involves a large amount of labor and expense, even if no defects or disputes with reference to defects arise. The car will pass over 600 or 800 miles of a road with a short inspection for safety and all practical requirements are met, but at every interchange point, although they may be 20 miles or less apart, the complete inspection referred to above is required. What the cost of this complete inspection may be to railroads of the United States it is difficult to conjecture.

If the safety to trains required such inspection there might be some argument in favor of it, but the fact that such inspection is not given except at interchange points, effectually answers the position taken by some, that if this inspection for protection were abandoned the liability to accidents would be greatly increased. The necessity to support a large force of inspectors at interchange points is not the only source of expense which railroads are subjected to by the requirements of Rule 2, that cars must be returned in as good general condition as when received, the very fact that a road is responsible for all minor defects which may develop, except as provided for in Rules 7, 8 and 9, compels railroads in many cases to make repairs to their own cars in order to facilitate interchange, which they would not make if the car were not liable to leave the line of road to which it belongs.

For example, a draft timber may be damaged on the end. For all practical purposes this draft timber is just as good and strong as when it was new. It might serve its legitimate purpose for years, but if the car is offered at an interchange point a card is required for the damaged draft timber, and this card authorizes any road which may feel so inclined to remove the draft timber, replace it with a new one and charge the road furnishing the card with the cost of doing the work.

This is only an example, but the same is true of a very large number of other items as enumerated in Rule 3, and at the present time railroads are making a practice when such cars come to shop to remove these defective parts, not because the safety of the car is in any way impaired, but simply to avoid questions at interchange points, which may delay the car and compel repairs under circumstances in which it can be done to less advantage than at the shops, and at a time when such repairs may mean serious delay to important freight. It would be a difficult matter to estimate how much the annual cost of car repairs is increased by this consideration, but anyone who has watched the matter carefully will say unhesitatingly that a decided increase is occasioned thereby.

The remedy for this condition of affairs would seem to lie in a modification of Rule 1 bearing on the care of foreign cars, which would authorize certain repairs under certain condition; of Rule 2, which would remove the condition that cars must be returned in as good general condition as when received; of Rule 4, by removing the condition that cars "may be refused" and substituting therefore that car "may be repaired" for the defects enumerated in said rule; of Rule 5, restricting the use of defect cards so that defect cards should not be required for defects for which owners are responsible; of Rules 7, 8 and 9, making car owners responsible for repairs of defects arising from ordinary usage, and protecting them fully against charges for repairs of damage caused by unfair usage.

In accordance with the above the Rules would read as follows:

Rule 1.—Each railroad company shall give to foreign cars while on its line the same care as to oiling and packing that it gives to its own cars, and shall make such repairs as may be necessary for the safe running of the car, or as may be required to prevent the extension of existing defects.

Rule 2. Cars should be delivered in good runningorder.

Rule 3. Cars may be repaired in accordance with the provision of Rule 1 if any of the following defects exist [the defects being as enumerated in Rule 3 of the M. C. B. code].

Rule 4. A car with defects which do not render it unsafe to run nor unsafe to trainmen must be accepted, but in such cases the company to which the car is offered may require that a defect card shall be securely attached to the car with four tacks, preferably on the outside face of the intermediate sill between the cross-tie timbers. Such cards shall not be required for defects for which owners are responsible.

Rules 5 and 6 should remain as they stand.

Rule 7. Locks, grain doors and inside parts of cars are at owners' risk.

Rule 8. Car owners shall be charged for repairs to their own cars with the following exceptions:

a. Damage caused by derailment, wreck, train parting, collision, fire or evident carelessness in handling cars, shall not be chargeable to owners.

b Charges for damage to draft rigging and sills shall be made in accordance with the following, the parts referred to being:

1. Couplers, or drawbars.
2. Drawbar springs.
3. Drawbar pockets, spindles, or their substitutes and followers.
4. Draw lugs and attachments, carry irons and filling blocks.
5. Draw timbers, or substitutes.
6. Deadwood or buffers.
7. End sills.
8. Longitudinal sills.

Damage to any of the items above numbered 1 to 8 shall not be charged for if accompanied with damage to other items, as follows:

1. If accompanied with damage to either 4, 5 and 7.
2. " " " " " " 4, 5 and 7.
3. " " " " " " 4, 5 and 7.
4. " " " " " " 1, 2, 3 and 7.
5. " " " " " " 1, 2, 3 and 7.
6. " " " " " " 7.
7. " " " " " " 1, 2, 3, 4, 5 and 6.
8. " " " " " " 7.

c In the case of damage to longitudinal sills, bills shall not be rendered if the damage is so extensive as to require the replacement or repairs to more than two sills.

d In the case of end or corner posts, bills shall not be rendered if the damage is of such a character as to require replacement or repairs to more than one end or one corner post on the same end.

e Damage caused by cornering or raking cars.

f In replacing brake shoes, no labor shall be charged, and no credit for scrap given.

g In renewing journal bearings no charge shall be made for labor of renewing, and an arbitrary scrap credit shall be allowed equal to one-half of the weight of the bearing applied.

h No charge shall be made for missing M. C. B. couplers, brake beams, brake levers, and top and bottom rods, and air hose.

i If repairs chargeable to owners exceeds $3 for one car, notice descriptive of the same shall be sent at once to the owner of the car, and no bill shall be rendered for repairs the material for which costs less than 25 cents.

j In case any car owner desires any road to hold material removed from cars and chargeable under paragraph I, the same shall be held after notice has been received, for a period not exceeding 30 days subsequent to the date of receipt of the notice.

The modifications of the M. C. B. Code of Rules, as outlined above, would practically overcome the necessity of inspection for protection at interchange points, and would substitute therefor a common-sense inspection for safety, as is now carried on at all division points where interchange does not come in to complicate matters.

There would be no increase in amount of repairs made to foreign cars, although at the first glance such increase would appear to be very probable. It should be borne in mind, however, that under the present rules all damage to foreign cars caused by unfair usage, as well as all minor damage which may be classed under the head of running repairs, is repaired by the road in possession of the car.

It will readily be seen that the amount of repairs under the suggested modifications to foreign cars will not be increased.

In fact, there seems to be good reason to believe that the amount of repairs will be decreased, as is illustrated in same example as was used before, to show that owners of cars are compelled to do unnecessary repairs in order to enable their cars to pass interchange points without question.

A foreign road offers a car to the car owner with end of draft timber damaged. The damage may not affect the efficiency of the draft rigging, and the draft timber may perform its functions with perfect safety for years. Under the rules, however, a card is required for the damaged draft timber, the owner of the car is authorized to make a bill for the replacement of said timber, and it is to his advantage to put in a new timber at the expense of the other road, although he would not consider for a moment the application of a new timber if he merely considered the requirements of safety and efficiency.

Another objection to the proposed modifications which immediately presents itself is that there would be a large increase in the number of bills rendered. This is possibly true to a limited extent. It should be remembered, however, that at the present time defect cards are required for almost every imaginable minor defect which can be discovered on a car, and that such defect cards warrant the issuing of a bill, and that with the change in responsibility for the minor defects it is more than probable that cars will pass indefinitely without repairs of this character being made, and that as a rule it will be found that the cars will find their way back to the owners for a large class of minor repairs which are now carded for, such repairs not being made until the general condition of the car makes it necessary to do so. This consideration affords a strong presumption that there will be no increase in the number of bills exchanged between railroads.

One of the strongest objections to the proposition to make car owners in general responsible for repairs not caused by unfair usage is the question of honesty. A road may bill for repairs which have never been made, or may bill for repairs caused by unfair usage, and the owner of the car would have no recourse. The above is true now of the items included under Rules 8 and 9. While undoubtedly some bills have been improperly rendered in these cases, the experience of the past 10 or 15 years demonstrates that unfair charges under these rules are of very minor importance, and that a careful scrutiny of the bills results in correcting irregularities which are of importance.

Wheels have always been considered as items for which owners are responsible, except when destroyed by unfair treatment. Cases occasionally occur in which an inspector will report wheels worn flat and thus chargeable to owner, when they have actually been made flat by sliding, and would then be chargeable to the party having the car in its possession. The fact, however, that bills for wheels worn flat are coming in from given points calls attention to the matter, and a remedy has always been obtained by calling the attention of the head of the department to the facts in the case. The same remarks will apply to the items of couplers, draft timbers, sills, etc.. which the above modificatious would place in the same list as that in which wheels now stand. With the restrictions as imposed in the modifications preventing charges for excessive damage a railroad could only be dishonest in this respect and charge for unfair damage by wilfully omitting to charge for part of the repairs which were made. This would be such a flagrant breach of honesty that the majority of men would hesitate before being guilty of the same. In addition to this an inspection of the cars on which such repairs have been charged would in most cases reveal the fact that more repairs were made to other parts than those billed for, and a better check can thus be had against dishonesty than is the case in many other bills which railroads are called on to pay. Notably among these being the bills and credits for foreign mileage. It has often occurred to the writer that even under the present rules some notice of repairs having been made is due to the car owner, even though the company making the repairs does not render a bill. This could readily be accomplished by the use of an M. C. B. repair card similar to the present M. C. B. defect card, but which would read:

Car No. 1,000.

Initials A, B, C, was repaired at Buffalo shops,

June 5, 1895, as follows:.....

The card should be attached to the car in the same manner as the ordinary M. C. B. defect cards, and would be a notice to owner's inspectors to examine into the matter of repairs, and determine if the same has been properly made in accordance with the M. C. B. rules. The stubs of these cards should be mailed monthly to the parties interested, or should be attached as a voucher to bill rendered. Objections to this would naturally arise, that the cards would be lost off. This is also true with the present M. C B. defect card, but it has not been found to be a serious objection, and from general observations the writer would say that the loss would not amount to one per cent. The attachment of the stub to bills for repairs should be made a condition of their payment.

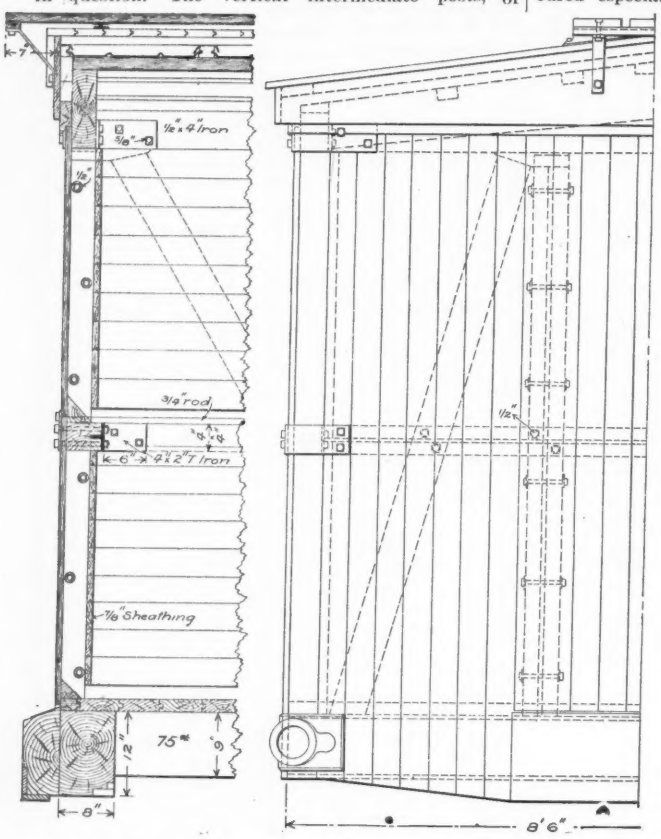
The modification of the rules as outlined above has been practiced between a number of important New England roads for a number of years. It has also been in use for the past year between a majority of the roads entering Chicago, and a number of their important connections. The results have been extremely satisfactory. The car service agents are unanimous, so far as heard from, in reporting that delay to cars on account of dispute at interchange points has been practically eliminated. The returns from 19 of the roads, representing a car ownership of 297,841 cars indicates that there is but slight increase, if any, in the amount of bills rendered, while at a number of points the cost of car inspection has been materially reduced. As to any reduction in the total cost of repairs, it is not possible to obtain any figures. There seems good reason to believe that a modification of the rules of interchange is seriously needed, and that the rules which would fully meet requirements ten years ago need with the change in the manner in which cars move a corresponding change in order to meet requirements of the present day. Many members of the M. C. B Association are strongly impressed with this idea. The various railroad clubs of the country are unanimous in their expression that some change should be made as outlined above. The Master Car Builders' Convention at its next meeting will take up this question in all seriousness, and it remains for the future to show whether it will be able to overcome the difficulties which are now apparent to everyone.

Hall Signals on the Michigan Central.

The Hall Signal Co. has just taken a contract for the erection of automatic block signals on 15 miles of the main line of the Michigan Central west of Detroit. The Michigan Central already has about 10 miles of its line from Detroit westward equipped with these signals.

Car Building Practice on the New York, Lake Erie & Western.

For about two years the New York, Lake Erie & Western Railroad has been using a construction for preventing the ends of freight cars from bulging, which has given great satisfaction. Cars loaded with flour or heavy package freight frequently bulge at the ends, especially when their speed is suddenly checked by an application of the brakes, and it is to prevent this bulging that the device in question has been used. Fig. 1 shows a half end elevation, a section and a plan of the method in question. The vertical intermediate posts, of



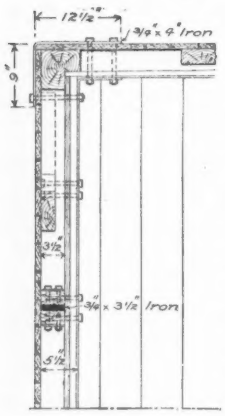


Fig. 1.—Details of Method for Strengthening Ends of Cars—N. Y., L. E. & W. Railroad.

which one is shown, have been strengthened by means of flitch plates 6 ft. 7 in. long, placed between the two timbers of the post. These plates are of iron, ¾ in. × 3½ in., the bolts extending directly through the timbers of the post and the flitch plate. The ends of the flitch plates fit into the intermediate post pockets. Besides this vertical strengthening the cars are strengthened horizontally by means of a T-iron 4 in. wide which extends across the end of the car and along the sides to a point 12½ in. back from the face of the end of the car. This is shown in the plan, Fig. 1. This T-iron is let directly into the timber of the end framing and is bolted through it as shown in the engraving. To further strengthen the ends of the car a corner plate is put on the car corners outside and corresponding in position to the T-iron just mentioned, so that the bolts extend through both plates. This corner iron extends 12½ in. back along the side of the car and 9 in. along its end. It is shown in the plan and elevation, Fig. 1. All the box cars built by the Erie Railroad are now provided with this arrangement for strengthening them, and it is also placed upon cars coming in for repairs. In all about 300 cars are in use at the present time equipped in this way, and there has been no indication of bulging in any of them since they have been so equipped.

Another novel arrangement adopted by the Erie road is the malleable iron bracket used in supporting the running board on the top of freight cars. This board is shown in plan, elevation and section in Fig. 2, and the bracket provides a light and secure method of supporting running boards. As will be seen, the running board is bolted directly to the bracket through flanges provided on the same, while the bracket itself is bolted through the roof, roof timbers and carline of the car. The body of the bracket is cast with open spaces to make it lighter. The bolting of the three planks of the running board to the bracket is done by means of six bolts and the bracket is secured to the car roof by two ⅝-in. bolts about 13 in. long.

Tests of Lamps and Gas.

A number of months ago we caused to be made a series of careful tests designed to show the comparative efficiency of several lamps used in car lighting, or designed for car lighting, and also the comparative efficiency of Pintsch gas and of compressed city gas. These tests were made by Dr. E. G. Love, 122 Bowery, New York City. Dr. Love is gas expert for the municipality of New York, and we have the greatest confidence in his skill and in his sense of professional responsibility. He acted under instructions to get facts, without favor, and to make such an investigation that he would be prepared to take the results into court if necessary.

The gas tested consisted of city gas, as shown in Table I., and of Pintsch gas, as shown in Tables III. and IV. The tanks marked *B*, *D*, *F* and *H* of city gas, were procured especially for the tests and Table I shows the sources of these gases and the pressures. All of the samples except the Altoona gas were taken by Dr. Love. Tanks *B* and *F* were compressed by the Safety Car Heating & Lighting Co., under his direction and in his presence. Tank *H* was filled from a storage tank, being the gas compressed and used by the Pennsylvania Railroad for car lighting. Tank *D* was sent from Altoona by the Pennsylvania officers.

The source of the Pintsch gas, results of which are shown in Table III., is indicated in that table. The

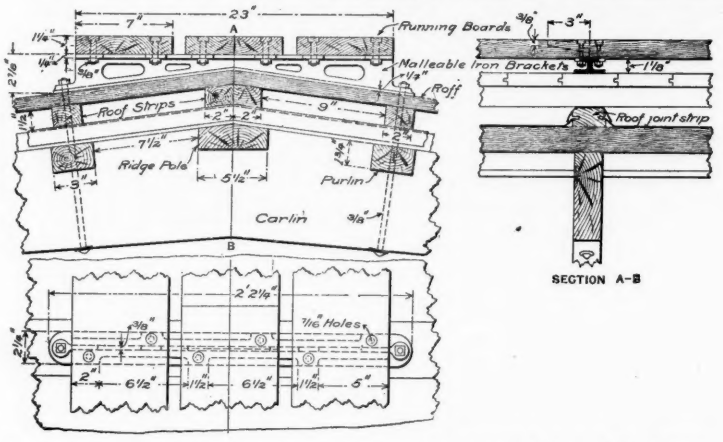


Fig. 2.—Malleable Iron Bracket for Supporting Running Board, N.Y., L. E. & W. Railroad.

Hoboken gas is that used by the Hoboken Ferry Co.; the Broadway gas is that used by the Broadway cable railroad. The pressures to which these gases were subjected were: Hoboken, 10 atmosphers; Broadway, 14.5; D. L. & W., 14. These samples were also taken under Dr. Love's directions and in his presence.

The Gordon-Mitchell lamp was furnished to us by Mr John Williams, New York, and was examined in position by Mr. J. Mitchell, who expressed himself as satisfied with the arrangement and with the performance of the lamp. The same is true of the Williams' lamp, which was an experimental lamp that they especially asked to have tried. The Pintsch-Argand lamp is a lamp which has been in experimental service for a number of months on the D. L. & W. Table IV. shows the results got with this same lamp with a modification of the shell intended especially for use with the Pintsch gas to get high efficiency.

The results shown in Table II., of the Jersey City and Altoona gases, burnt in three different lamps, were all taken at an angle of 40 deg. below the horizontal. This was considered sufficient as the purpose was in this part of the test to get the efficiency of the gas rather than that of the various lamps. The results shown in Table III. and Table IV. are from observations made at each 15 deg. in the lower quadrant, these tests being designed not only to get the value of the gas, but the relative efficiency of the lamps. By comparing the results got with

TABLE I.

Tank marked.	B.	D.	F.	H.
Nature and source of gas.	Water-gas Jersey City, N. J.	Coal-gas, Altoona, Pa.	Water-gas Jersey City, N. J.	Water-gas Jersey City, compressed and used by Penn. R. R.
Original compression, approximate atmospheres	15		11	17.5
Pressure in sample tank atmospheres	15	15.5	11	15.5

TABLE II.

Gas.	Tank marked.		Gordon-Mitchell Lamp.			Pintsch Argand Lamp.			Williams Lamp.		
			Consumption Ft. per hour.	Candle power.	Candles per ft.	Consumption Ft. per hour.	Candle power.	Candles per ft.	Consumption Ft. per hour.	Candle power.	Candles per ft.
Jersey City.	B	Aver. of 5 tests.	6.89	26.17	3.80	7.38	23.18	3.15	5.87	30.12	5.13
	F	Aver. of 5 tests.	6.63	26.17	3.94	7.09	19.91	2.67	6.11	27.87	4.56
	H	Aver. of 5 tests.	6.84	22.66	3.31	7.46	17.00	2.28	6.35	26.79	4.22
			6.78	25.00	3.69	7.31	19.70	2.70	6.11	28.26	4.64
Altoona	D	.....	8.14	17.94	2.20	8.98	13.60	1.50	6.41	15.12	2.35

TABLE III.

Gordon-Mitchel Lamp and Pintsch Gas.

Angle to Horizontal.	Hoboken Gas. Cons.	C. P.	Candles per foot.	Broadway Gas. Cons.	C. P.	Candles per foot.	D., L. & W. Gas. Cons.	C. P.	Candles per foot.	Average candles per foot.
0°	3·26	35.68	10.93	3.26	34.06	10.44	3 40	32.03	9.43	10.26
15°	3.27	39.29	12.04	3.23	38.82	12.03	3.40	37.11	10.93	11.67
30°	3 26	36.11	11.06	3.23	36.54	11.33	3.40	34.15	10.06	10.82
45°	3.26	34 06	10.44	3.23	32.37	10.03	3.40	30.89	9.08	9.8)
60°	3.26	31.83	9.75	3.23	29.81	9.24	3.40	28.35	8.33	9.11
75°	3.26	25.53	7.82	3·24	25.27	7.84	3.40	23 38	6.87	7.51
90°	3.26	21.50	6.59	3.23	22.10	6 85	3.40	18.62	5.47	6 30

Average of total, 9.36

Williams Lamp and Pintsch Gas.

Angle to Horizontal.	Hoboken Gas. Cons.	C. P.	Candles per foot.	Broadway Gas. Cons.	C. P.	Candles per foot.	D., L. & W. Gas. Cons.	C. P.	Candles per foot.	Average candles per foot.
0°	2.81	2.14	0.76	....	....	....	..	....	....	0.76
15°	2 81	23.04	8.20	2.80	23.35	8.32	3.16	23.46	7.41	7.98
30°	2 81	29.69	10.56	2 74	29.20	10.63	3.03	31.00	10.25	10.48
45°	2.81	36.65	13.04	2 80	34.15	12.20	3.04	36.22	11.95	12.40
60°	2.81	42.58	15.15	2 70	36.49	13.52	3.05	40.34	13.27	13.98
75°	2 81	46 39	16.51	2.72	41.46	15.24	3.03	42.87	14.15	15.30
9.°	2.81	38.77	13.80	2.73	36 49	13.37	3.06	36.73	12 00	13.06

Average of total, 10.56

Pintsch Flat Flame Lamp and Pintsch Gas.

Angle to Horizontal.	Hoboken Gas. Cons.	C. P.	Candles per foot.	Broadway Gas. Cons.	C. P.	Candles per foot.	D., L. & W. Gas. Cons.	C. P.	Candles per foot.	Average candles per foot.
0°	3.73	45.87	12 25	3.86	40.23	10 41	3.95	31.86	8.05	10 25
15°	3.73	49.85	13.36	3.87	43.22	11.17	3.95	33.42	8 45	10.99
30°	3.73	45.28	12.13	3.86	39.30	10.18	3.95	31.70	8.01	10.10
45°	3.73	44 45	11.92	3 85	38 41	9.97	3.97	30.57	7 69	9.86
60°	3 73	41 59	11.15	3.86	36.10	9.34	3.97	28 93	7.28	9.26
75°	3.72	37.89	10.17	3.86	33.80	8.74	3 97	26 87	6.75	8.55
9.°	3.72	32.51	8.74	3.98	28 63	7.19	3.96	23 69	5.98	7.30

Average of total, 9 47

Pintsch Argand 1st shell) and Pintsch Gas.

Angle to Horizontal.	Hoboken Gas. Cons.	C. P.	Candles per foot.	Broadway Gas. Cons.	C. P.	Candles per foot.	D., L. & W. Gas. Cons.	C. P.	Candles per foot.	Average candles per foot.
0°	3.25	28 70	8.83	3.25	28.99	8.92	3.43	29.12	8.49	8.75
15°	3.25	33.23	10.22	3.25	32.52	10.01	3.43	33.04	9.63	9.95
30°	3.25	37.38	11.52	3.24	37.16	11.47	3.41	36.12	10.59	11.19
4..°	3.25	42.87	13.19	3.24	43.40	13.40	3.41	43.16	12.66	13.08
60°	3 25	48.06	14 79	3.24	46.83	14.45	3.42	45.39	13.27	14.17
75°	3.25	51 36	15.80	3.24	49.34	15.23	3.42	49.07	14-35	15.13
90°	3 25	52.78	16.24	3.24	50 00	15.43	3.42	51.77	15.14	15 60

Average of total, 12.55

the city gases at 40 deg. with those got with the Pintsch gas at 45 or with the mean of the Pintsch results at 30 and 45, one can get the relative value of the gases in the various lamps.

The lamps were lighted to burn some time before testing was begun in order to heat each lamp to its normal condition in use.

As the object was to get the efficiency under practical conditions the consumption was regulated to produce a

TABLE IV.—PINTSCH ARGAND (2D SHELL) AND PINTSCH GAS.

Angle to Horizontal.	D., L. & W. Gas.		
	Cons.	C. P.	Candles, per ft.
0°	3.73	35 91	9.63
15°	3.71	42.92	11.57
30°	3.69	45.71	12.39
45°	3.69	52.91	14 34
60°	3.68	58 42	15 87
75°	3.68	60.15	16.34
90°	3.68	61.96	16.84

Average, 13.85

flame suitable for car lighting. Had the burners been crowded to the point of smoking a greater efficiency would doubtless have been obtained. The volume of gas consumed was reduced to 60 deg. Fahr. and 30 inches barometric pressure.

It is quite unnecessary for us to make any deductions from these tables. The facts are very apparent.

Canda's Long-body Flat Car.

We show in Fig. 1 an illustration of a long-body flat car made by the Ensign Manufacturing Co., of Huntington, W. Va. About 80 of these cars are now in use,

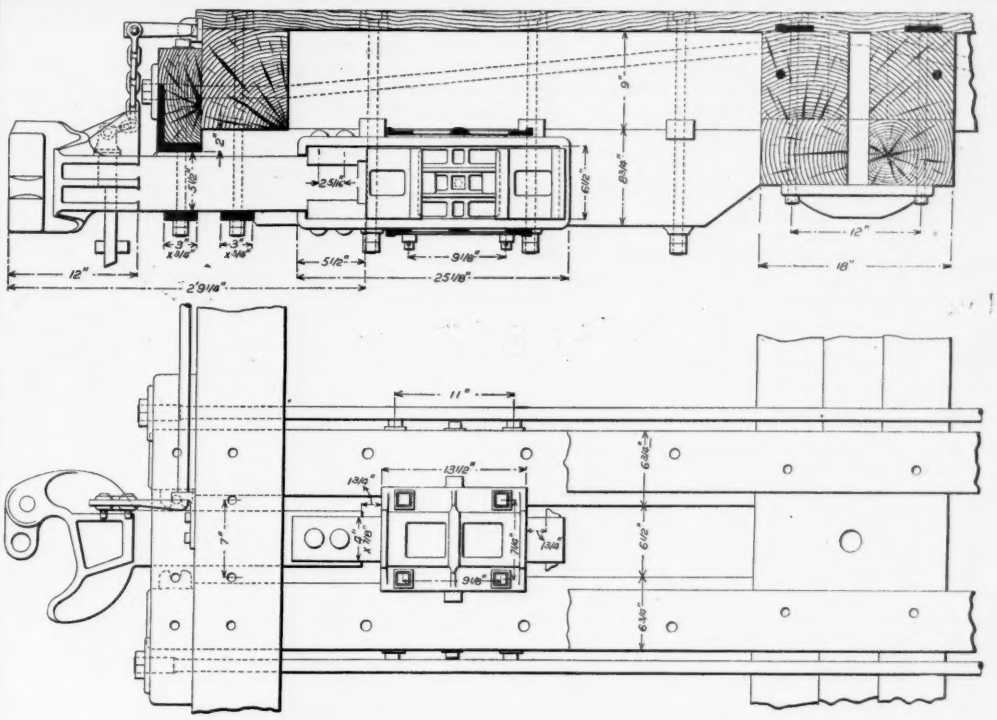


Fig. 2.—Draft Rigging—Canda's Long-Body Flat Car.

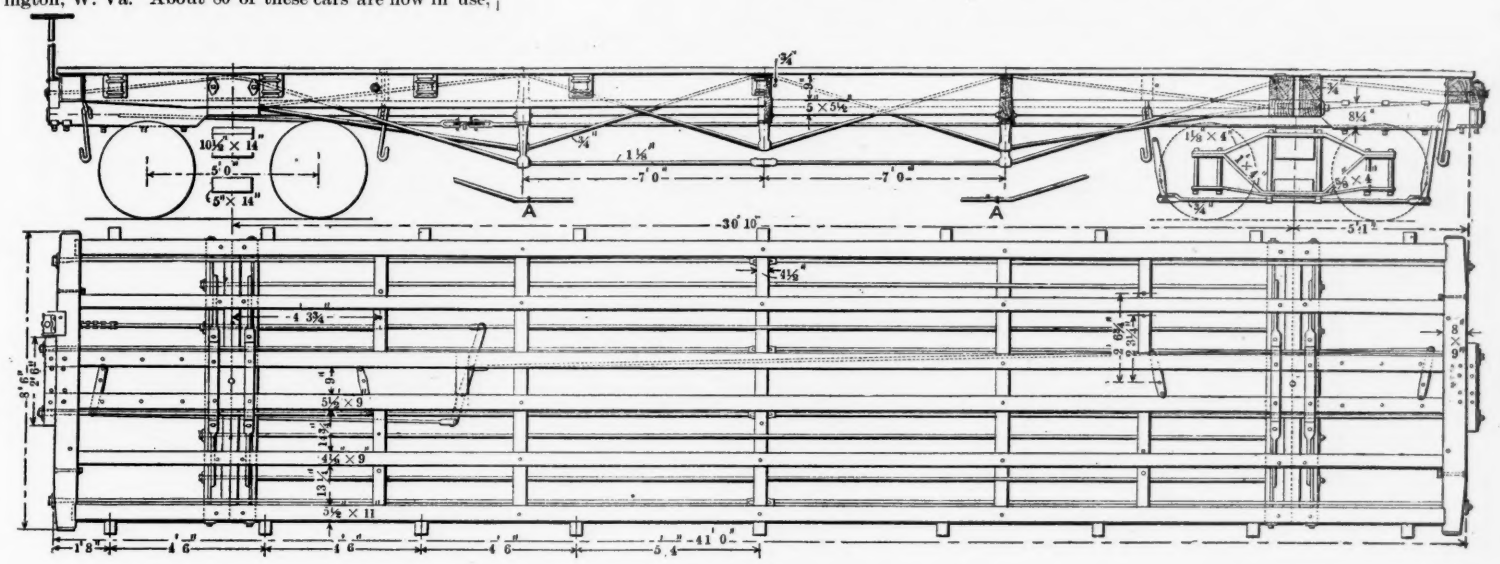


Fig. 1.—Canda's Long-Body Flat Car—Ensign Manufacturing Co.

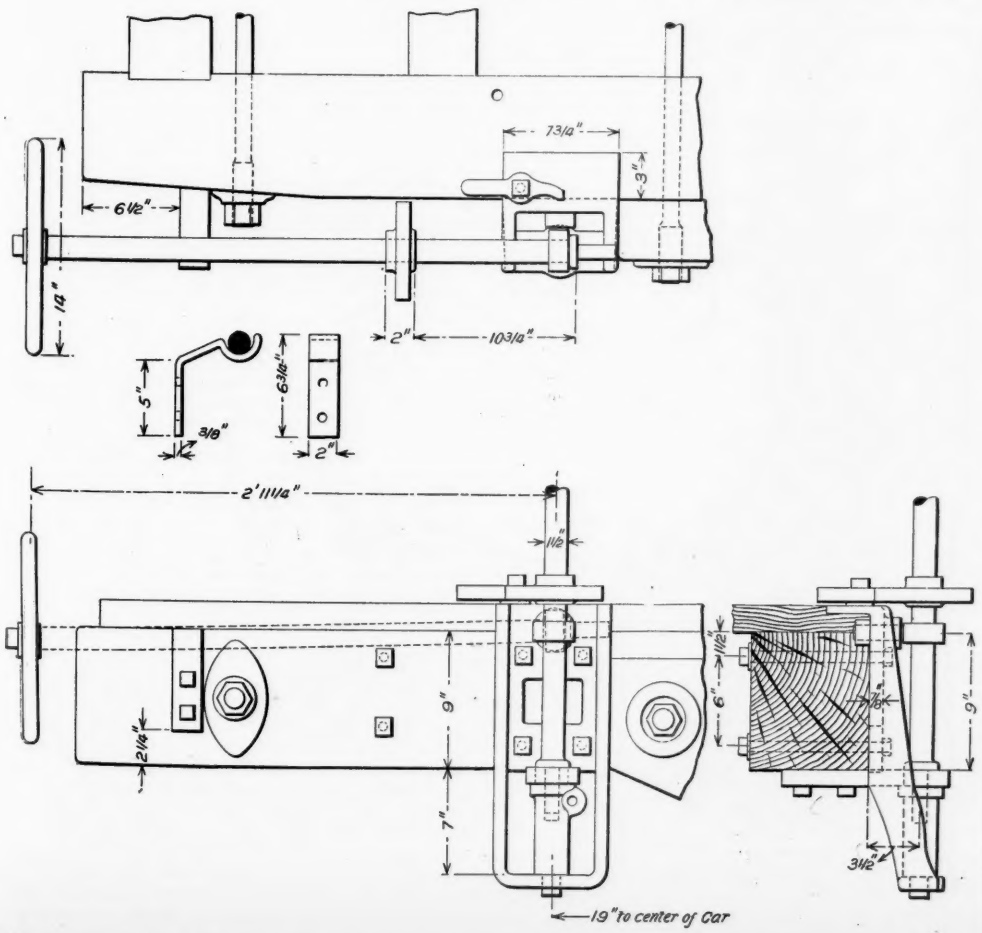


Fig. 3.—Details of Folding Brake-Shaft—Canda's Long-Body Flat Car.

their principal service being in hauling long pieces of timber which could not be placed upon a flat car of ordinary length. On account of its extreme length there would be a tendency for the car to buckle when placed unloaded in a heavy train. To meet this possibility the king and queen post under trussing is counter trussed, as shown in the engraving, Fig. 1. This under trussing is constructed under patents held by Mr. F. E. Canda. These cars have been in constant service for about five years, hauling sills and other lumber from Georgia points to northern car works, and although always loaded to their maximum carrying capacity they have given perfect satisfaction, and have maintained their camber under all circumstances.

The capacity of the car is 30 tons and its length is 41 ft. It is 8 ft. wide and weighs 23,700 lbs. The trucks are of the rigid diamond pattern with 10½-in. × 14-in. bolster. The journal boxes are rigidly bolted to the sides. The spring plank is 5 in. × 14 in., and National hollow-brake beams are used, which are hung from the body of the car. The axles are M. C. B. 60,000 lb. standard, made from double-hammered selected scrap, and the springs are made by the W. A. French Spring Co. Schoen pressed-steel center-plates are used upon these trucks. The arch bars are: top, 4 in. × 1⅛ in.; bottom, 4 in. × 1 in.; tie, 4 in. by ¾ inch.

Double-plate wheels 33 in. in diameter and weighing 600 lbs. have been provided which are made of chilled cast iron in the Canda patent contracting chill.

Regarding the car body, the side sills are 5½ in. × 11 in. The intermediate sills are 4½ in. × 9 in., and the center sills are 5½ in. × 9 in. The end sills are 8 in. × 9 in. and the bolsters are in two pieces and are 6 in. × 18 in. The longitudinal sills are Georgia pine, while the end sills and all the other framing is of West Virginia white oak. The trussing of these cars, of which we have before spoken, consists of 1⅛ in. truss rods with turnbuckles and of two intermediate truss rods of ⅞ in. diameter. The counter trussing is all of ¾ in. rods. As will be seen from the engraving, Fig. 1, there are Canda patent collars forged upon the truss rods at *A*, *A* which are intended to prevent the struts from creeping.

The draft rigging is shown in Fig. 2. It is of malleable iron made under the Canda patent. Westinghouse air-brakes are provided, with brake shaft for hand brakes.

In order that the cars may be loaded, as designed, with long pieces of timber, these brake shafts are so arranged as to turn down out of the way when the car is loaded. The details of this construction are shown in Fig. 3.

Janney automatic freight couplers are used upon this car. When finished the cars are painted with three coats of Sherwin-Williams paint, the iron work receiving one coat of black asphaltum.

Electric Equipment—Metropolitan Elevated Railway, Chicago.

We described in the *Railroad Gazette* for Feb. 1 the cars to be used on the Metropolitan Elevated Railway, Chicago. In our issue of Feb. 15 we published an article upon the electrical equipment of that road. Concerning the generators and method of obtaining contact from the third rail, we now have more complete information.

The generating plant consists at present of two 1,500 kw. generators similar to those now operating the Brooklyn City Railway of Brooklyn, People's Traction Railway of Philadelphia, and two 800 kw. generators similar to those in railway station at Buffalo and at St. Louis. These generators, and, in fact, the entire electric equipment, was supplied by the General Electric Company. They are of the standard general electric type, with fields entirely of steel. The pole pieces in the 1,500 kw. machine number 12, and in the 800 kw. machine 10. The armatures are built up of sheet iron laminations which are individually secured to the hub by dove-tailed keys. The armature windings consist of hard-drawn copper bars, imbedded in mica-lined slots in the outer armature surface. Special provision in the construction of the armature core is made to insure thorough ventilation. The field spools can be removed without disturbing the field frame,

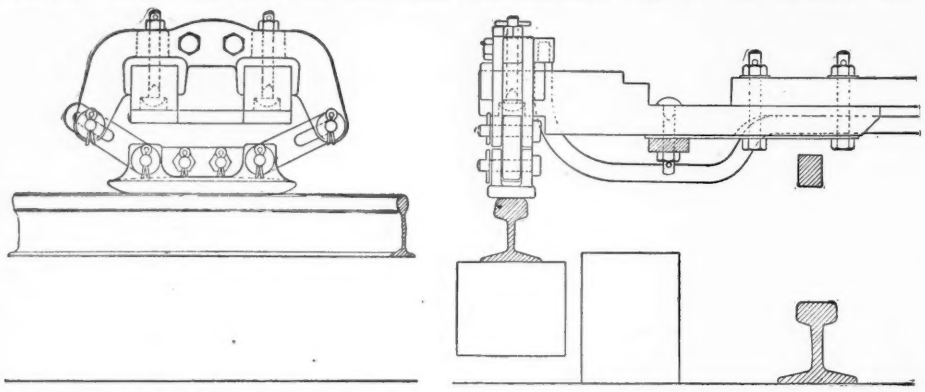


Fig. 1.—Contact Shoe, Metropolitan Elevated Railroad, Chicago.

and both armature bars and commutator segments are individually removable. The question of temperature has received careful attention, and that of these machines is guaranteed not to exceed that of the surrounding atmosphere by more than 46 deg. centigrade, while in actual practice the temperature rarely rises above 30 to 35 deg. centigrade. The commercial efficiency of these machines is guaranteed to be not less than 94 per cent. Their design is such that they can stand an overload of 60 per cent. for a short time, and shift from that to no load without sparking at the commutator.

These machines are set between the high and low-pressure sides of the engine, and are thus enclosed by the engine frames. The dimensions of the generators are as follows:

	M. P. 1,500-KW.	M. P. 800-KW.
Diameter of field.....	15 ft. 10½ in.	12 ft. 6 in.
Width of field	3 ft	2 ft. 6 in.
Diameter of armature.....	10 ft. 6 in.	7 ft. 10½ in.
Width of armature.....	6 ft.	5 ft. 1 in.
Weight of fields	104.600 lbs.	60,000 lbs.
Weight of armature.....	82 100 lbs.	46,000 lbs.
Total weight of generator..	186,700 lbs.	106,000 lbs.

From the generators the current is led over insulated copper cables to the switchboards, which are built up of General Electric standard generator and feeder panels. Each of the former is equipped with the necessary field rheostat, lightning arrester, volt-meter plug switch and positive and negative main switches, both single pole. In addition it carries a Weston ammeter, and an automatic circuit breaker, which breaks the generator circuit instantly should a dangerous overload be thrown upon the machine by accident. The equalizing switch is mounted on a pedestal near the generator, and the length of the equalizer is thus reduced.

The field rheostat and lightning arrester are set at the back of the board, the former being operated from the face by a hand wheel. A discharge resistance is attached to the field rheostat to cushion the discharge when the field switch is opened. It is connected in series with a pilot lamp in front of the panel. The lightning arrester consists of an iron clad electro-magnet in the field of which are two carbon points separated by a $\frac{1}{32}$-in. air gap. The points are connected between the generator lead and ground; the magnet between the generator and line, and the induction of its windings affords additional protection to the generators against lightning. The lighting switch is single pole and quick break and is connected to the negative terminal main switch. The positive side of the lighting circuit is connected through a magnet cut out to the equalizing bus. Current can therefore be supplied for lighting purposes from any generator whether its circuit breaks or main switch is open or closed. The voltmeter is a Weston illuminated dial instrument which is connected by the insertion of a plug on the four point receptacle in front of the board, two of the points being connected to the generator between it and the main switch, the other two to the voltmeter bus bars.

The feeder switchboard is divided into a separate panel for each feeder. The overhead line is divided into sections and each panel corresponding to any one section is equipped with its own circuit breaker. Each panel also carries an ammeter and quick break switch. In addition the main switchboard is equipped with a "G" recording watt-meter indicating the total output of the station.

From the station the current is conducted by heavy feeder cables to the lateral third rail used as a working conducter, this rail is fastened to heavy timber beams outside the guard timbers of the regular track. The top of the rail is elevated somewhat above that of the service rails, which are used for the return and are carefully bonded by two copper strips, one on each side, of extra large cross-section, riveted cold through the holes in the web.

The motors for the motor cars are known as G. E. 2,000 a title explained by the power of the motor which is rated at 2,000 lbs; horizontal draw-bar pull through a 33-in. wheel at 20 miles an hour. The rated capacity is 100 H. P. under normal conditions, and 150 H. P. for short intervals. The maximum speed is rated at between 35 and 40 miles an hour on straight and level track.

These motors are of the single reduction type, 33 in. high and 50 in. wide over gears. The field frame is of steel, and the armature of the iron-clad type with series drum single turn barrel winding, these windings being set in slots in the surface of the core. The motor is thus rendered mechanically staunch and easy of repair. The insulation both of the armature and the field is of asbestos and mica making deterioration of insulation impossible.

It is entirely enclosed and is dust and waterproof. Two doors at the commutator end allow of access to the interior, and the motor can be readily inspected either from above or below.

Two of these motors are mounted upon one of the two trucks of the motor cars—one to each axle. In addition to the motors each car is equipped with two series parallel controllers especially designed for this work and two electric air compressors for their brakes. The motors are protected by an automatic main switch which is in this case a "K" automatic circuit breaker. In the operation of the controller when a quick start is desired the handle is brought round one-half a turn to the right, thus bringing the motors into multiple at full speed. If the start is to be the ordinary gradual acceleration, thehandle is moved half a turn to the left, and the motors brought up to half speed, another turn in the same direction throws them in multiple and they move forward at full speed. The arrangement is such that each motor takes an equal portion of the load, one of the most important factors in traction work.

The reversing switch, which is arranged at the side of the controller and is capable of movement from and toward the motorman, is equipped with a safety interlocking device. This operates to render the reversal of the motors impossible should the controller handle not be in the right position. Current is taken from the third rail by a contact shoe, shown in Fig. 1, which hangs from an oaken beam projecting from the side of the car. The shoe is suspended by means of links which allow of its accommodating itself to any unevenness of the rail or track. Each motor truck is equipped with two of these, one on either side. Going north the right shoe is in contact, going south the left shoe. The road has no loops at the terminals.

Each motor car is provided with two motorman's compartments built out upon the platforms, set diagonally at each end. Each compartment contains its own controller and pump. Fifty-five motor cars and 100 trailers will make up the rolling stock of the road at its opening.

The trains will consist at first of one motor car fitted up as a smoking car and three trailers. Each motor car fully loaded and equipped will weigh 63,500 lbs., each trailer car loaded, 46,000 lbs. With the two motor cars and three trailers the average speed will be 13 miles an hour, measured on the tangents of the Garfield Park line, including stops of 15 seconds each at stations approximately 2,000 ft. apart. The present plans contemplate the eventual adoption of six car trains made up of one motor car, equipped with G. E. 2,000 motors, and five trailers. The average speed of these trains on the Garfield tangents will be 15 miles an hour including stops.

The Ohio Locomotive Injector.

In the engraving is shown the Ohio locomotive injector, which has been in use on several prominent roads for over a year. I is of skillful design, embodying both simplicity and neat appearance, and the construction permits a thorough inspection of all the parts. It is made in ten sizes, with capacities ranging from 230 to 3,400 gallons of water per hour, determined from actual tests. It is said to show a high duty, and to work well with varying steam pressures, also admitting of a close regulation in the amount of water delivered. Its action in starting is prompt and positive, and it can be used also as a heater when necessary.

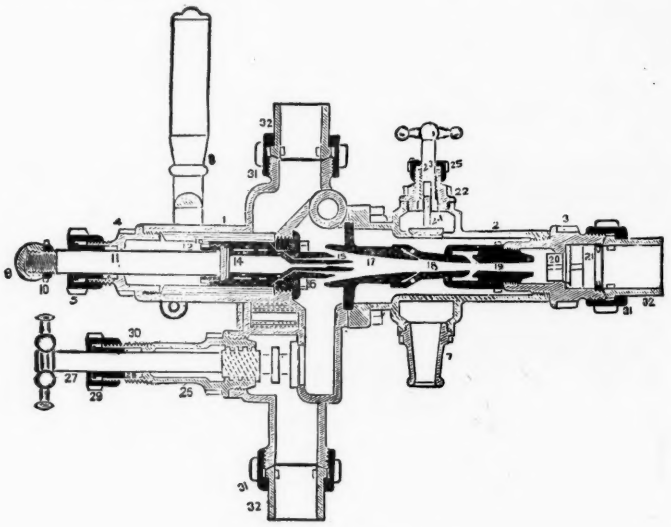
It is a lifting injector. The first movement in starting, drawing the handle, 8, to the left, unseats the steam valve, 13, and admits steam through the lifting tube, 15. As soon as water appears at the overflow, 7, a further withdrawal of the handle, 8, is made and the lifting tube, which also serves as a valve, is unseated, thus admitting steam through the steam tube, 16, and starting the operation of the injector. The quantity of water is regulated by valve, 27, which is operated by a screw. To stop the injector, the handle, 8, is pushed in, thus seating the valves.

When it is desired to use the injector as a heater, the overflow valve, 24, is first closed by screwing down the stem 23, and then the handle, 8, is pulled back until the resistance of the lifting tube is felt. Valve 24 should not be kept closed as it is only used when the injector is employed as a heater.

Instead of using a lever in starting, there is another style which has a screw attachment.

The body of the injector is made in two parts, 1 and 2, which are bolted together, the intermediate tube, 17, being held between them. The condensing tube, 18, and delivery tube, 19, requiring more attention than the others are screwed on to the check valve, 3, which can be removed with an ordinary wrench without disturbing any of the other parts but the union which unites the injector to the delivery pipe. By this construction, ease of inspection and cleaning is greatly facilitated and the cost of repairs is reduced to the minimum amount. The tubes are made of special metal which has shown great wearing qualities.

There are two standards, the Ohio and the Pennsylvania, which differ materially only in the length of the body, 2. Both are interchangeable with the principal injectors in use, thus incurring little expense in attaching it. They are made by the Ohio Injector Company, Mr. Frank W. Furry, 1302 Monadnock, Chicago, General Manager. The works of the company are at Wadsworth, Ohio.



The Ohio Injector.

April Meeting of the American Railway Association.

The official report of this meeting has just been issued. The report of the Train Rule Committee and of the Committee on Safety Appliances are discussed in the editorial pages of this issue, and we note below such other matters as were not covered by the report published in the *Railroad Gazette* of April 26. The committee on general regulations for employees is now a standing committee, and consists of: S. M. Prevost, J.

T. Harahan, J. M. Toucey, J. G. Metcalfe, W. E. Gray, T. A. McKinnon, W. H. Green, C. H. Platt and I. G. Rawn. The Chairman of the Committee on International Railway Congress is Mr. H. Walter Webb, of the New York Central.

The report of the Committee on Car Service presented a summary of statisties, reported by about 50 roads, of the mileage of foreign cars upon their lines, and the number of days occupied by this mileage, during the year 1894. Some of the roads did not report for all the months, but the total is so large that the average doubtless truly represents the actual conditions. This average is 27.8 miles a day, the total movement in the report being about 1,300 millions of miles. The committee states, however, that certain private cars, in making a mileage of 25 million miles, average 53.6 miles a day, while certain cars owned by railroad companies, in traveling 29 million miles, averaged only 21.76 miles a day. These figures include about 5 per cent. of the whole mileage reported, so that it is concluded that 24 miles a day is not far from right for railroad companies' cars. On this basis, at 6 mills a mile, a car will earn only 14.4 cents a day, and the Committee, therefore, suggests 15 cents a day as a fair per diem rate. The report goes on to set forth the well-known difficulties in adopting a per diem system and emphasizes the fact that a Board of Arbitration would have to be provided. Regulations for using the per diem system are again presented. The report was accepted, but the Association postponed the whole subject, pending the taking of a letter ballot to see whether 75 per cent. of the roads would favor the adoption of per diem, beginning next January.

This report also gives a summary of replies to an inquiry as to the official day, as used in car service. It appears that 117 roads, operating 844,000 cars, end the day at midnight. On about 26,000 miles the day ends at 6 p. m., and there are nine other hours in use to a limited extent.

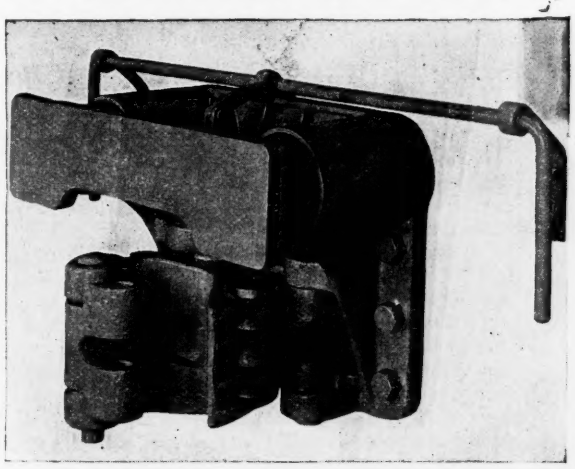
The Joint Committee on interlocking and block signals made a report embodying a proposed code of rules for the telegraph block signal system (non-automatic and not "controlled"). The committee is encouraged by the fact that 149 companies, operating 103,000 miles of road answered the last circular. No decision is reached as to colors for night signals, but the company approves the use of red for danger and green for clear as "good signal practice."

The rules presented by the committee were discussed at considerable length and were adopted with little or no amendment.

Secretary Allen has issued a revised edition of the standard code of train rules, the price of which (single copies) is 75 cents.

A Tender and Locomotive Buffer.

The Gould Coupler Co. is always enterprising and ingenious in devising improvements. We show this week the new spring buffers recently brought out for use on



Gould Tender Coupler and Buffer.

pilots and tenders. The arrangement is so obvious from the engravings that no description is necessary. It will be observed that it is very compact and mechanical in its appearance.

Mineral Production of the United States 1893 and 1894.

We publish herewith a table compiled by Mr. Richard P. Rothwell, showing the production in 1893 and in 1894 of the various minerals in the United States. It will be observed that the quantities are given in customary measures and also in metric tons, and that the values are given.

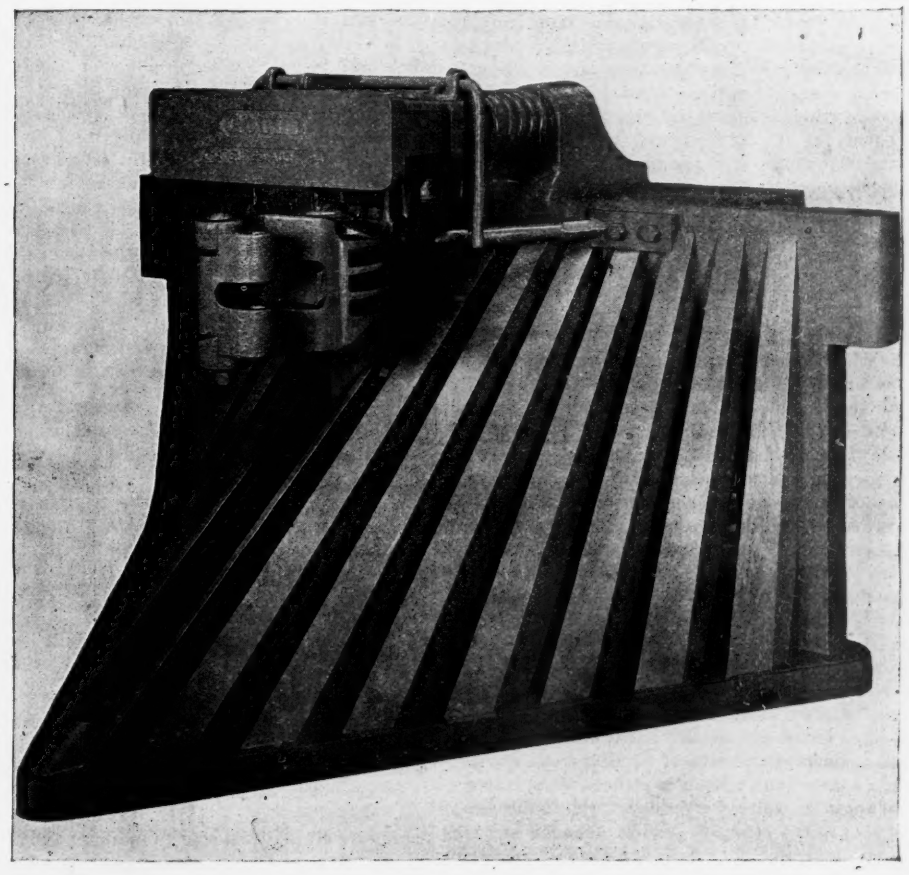
It is a surprise to see that the decrease in the production of bituminous coal was only about 9 per cent., or 11,000,000 tons. In anthracite coal the production increased nearly 10 per cent.; that is, 4,700,000 tons. The net decrease in tons was, therefore, 3½ per cent. The decline in value was 7 per cent. In pig iron the decrease was about 400,000 tons. The decrease in value, however, was $22,000,000. In silver the decrease was about 18 per cent. and in gold the increase was 184,000 oz., or 11 per cent. In value the increase was $3,800,000, and $6,764,000 over 1892. Australia showed a considerable gain in 1894 and runs the United States closely. The phenomenal increase in South Africa makes that country a close competitor for the first rank in gold production.

MINERAL PRODUCTION OF THE UNITED STATES, 1893 *and* 1894.

Compiled for THE MINERAL INDUSTRY, Vol. III.,
By Richard P. Rothwell, editor of "The Engineering and Mining Journal."

No.	Products.	Customary Measures.	1893. Quantity. Customary Measures.	1893. Quantity. Metric Tons.	1893. Value at Place of Production.	1894. Quantity. Customary Measures.	1894. Quantity. Metric Tons.	1894. Value at Place of Production.
	NON-METALLIC.							
	Abrasives—							
1	Corundum and emery	Short tons	1.747	1,585	$140,589	1,220	1,106	$109,500
2	Garnet	"	1,520	1,379	55,800	1,000	907	35,000
3	Grindstones	"	45,340	41,133	345,920	37,400	33,922	335,800
4	Millstones	"	155	141	2,359	297	269	4,447
5	Tripoli and infus. earth	"	1,351	1,226	25,625	1,802	1,634	36,087
6	Whetstones	"	1,903	1,726	89,550	1,735	1,574	84,450
7	Alum	"	96,000	87,093	2,880,000	72,000	65,304	2,160,000
8	Antimony ore	"	850	771	41,000	165	150	9,075
	Asbestos and Talc—							
9	Asbestos	"	120	109	6,000	250	227	3,750
10	Fibrous talc	"	36,500	33,113	337,625	39,600	35,917	396,000
11	Talc and soapstone	"	20,100	18,235	366,825	21,044	19,087	401,892
12	Asphalt	"	3,490	3,166	68,682	4,198	4,080	75,654
13	Bituminous rock	"	31,404	28,489	114,752	24,199	25,018	148,120
14	Barytes	"	26,632	24,161	133,160	23,758	21,548	95,032
15	Bauxite	Long tons	19,041	10,896	55,205	10,732	10,908	42,928
16	Borax	Pounds	9,199,000	4,173	689,925	13,140,580	5,962	919,841
17	Bromine	"	348,399	158	87,100	379,444	172	98,655
18	Cement, natural hydraulic	Bbls., 300 lbs.	7,445,950	913,677	5,010,958	7,895,259	1,074,179	4,397,407
19	Cement, Portland	"	673,989	91,715	1,052,173	738,196	100,352	1,080,644
20	Clay, refractory	Short tons	3,214,989	2,916,591	4,822,483	3,375,738	3,061,794	4,050,885
21	Clay, kaolin	"	30,183	27,382	205,667	24,552	22,246	185,169
22	Coal, anthracite	"	47,355,387	42,960,116	74,605,885	52,010,433	47,183,845	80,879,404
23	Coal, bituminous	"	a128,826,364	116,869,397	123,899,415	a117,950,348	106,953,311	103,842,467
24	Coke	"	8,939,961	8,104,202	14,706,544	8,495,295	7,706,846	12,654,558
25	Cobalt oxide	Pounds	3,894	2	5,452	6,550	3	8,843
26	Copperas	Short tons	17,862	16,204	134,520	14,897	13,511	104,160
27	Copper sulphate	Pounds	54,000,000	24,492	1,822,500	e60,000,000	27,215	2,016,000
28	Chrome ore	Long tons	1,629	1,646	16,000	2,653	2,697	35,125
29	Feldspar	"	17,000	17,274	85,000	23,280	23,655	116,400
30	Fluorspar	Short tons	9,700	8,800	63,070	9,000	8,165	64,000
31	Graphite	Pounds	882,912	400	39,731	770,846	349	34,689
32	Graphite, amorphous	Short tons	1,691	1,534	8,996	165	150	1,252
33	Gypsum	"	330,231	299,682	927,615	287,517	279,437	849,925
34	Lime	Bbls., 200 lbs.	e60,000,000	5,443,164	30,000,000	e56,750,000	5,104,355	28,375,000
35	Magnesite	Short tons	1,143	1,037	8,000	1,370	1,243	4,864
36	Manganese ore	Long tons	9,150	9,297	60,000	11,735	11,924	74,890
37	Mica, ground	Pounds	679,000	308	29,522	820,500	377	35,957
38	Mica, sheet	"	6,500	3	5,478	9,900	4	11,103
39	Monazite	"	130,000	59	7,600	750,000	340	45,000
40	Natural gas				14,000,000			11,000,000
41	Paints, mineral	Short tons	44,709	40,559	726,160	38,801	34,201	662,262
42	Paints, vermilion	"	37	34	40,000	41	37	45,600
43	Paints, white lead	"	88,500	80,286	9,469,500	87,242	78,155	8,445,174
44	Paints, zinc oxide	"	25,000	22,679	1,875,000	22,814	22,172	1,711,275
45	Petroleum (crude)	Bbls., 42 gals.	50,349,228	6,978,403	32,223,505	48,527,336	6,725,490	40,762,962
46	Phosphate rock	Long tons	981,340	997,140	3,434,690	952,155	967,485	2,856,465
47	Marls	"	200,000	203,814	540,000	225,000	228,622	607,500
48	Precious stones				200,000			250,000
49	Pyrites	Long tons	95,000	95,526	285,000	107,462	109,192	466,466
50	Salt, evaporated	Bbls., 280 lbs.	9,703,419	1,232,392	4,945,583	9,161,053	1,163,508	4,608,275
51	Salt, rock	"	1,935,642	245,838	678,064	2,341,922	297,438	788,681
52	Silica, sand and quartz	Long tons	300,000	304,814	330,824	315,531	320,610	347,951
53	Slate, roofing	Squares	803,887	237,014	2,956,895	693,944	204,656	2,551,259
54	Slate, other manufactures	Square feet	4,138,920		475,681	5,099,791		499,578
55	Soda, natural	Short tons	2,500	2,268	12,500			
56	Soda, natural sulphate	"	90	82	450			
57	Stone, limestone (flux)	Long tons	3,750,000	3,810,375	2,250,000	3,544,393	3,602,290	2,126,636
58	Stone, marble	Cubic feet	5,639,681	429,390	2,087,758	5,681,766	433,093	2,177,280
59	Stone, onyx	"	2,175	166	28,750	1,450	110	29,000
60	Other building stones				e38,000,000			e50,000,000
	Total non-metals				377,517,086			353,760,877
	METALS.							
61	Aluminum	Pounds	a312,000	142	202,800	817,600	371	490,560
62	Antimony	Short tons	350	318	63,000	220	205	39,200
63	Copper	Pounds	327,255,788	148,441	35,179,997	353,504,314	110,483	33,540,489
64	Gold	Troy ounces	1,739,323	*75,764	35,955,000	1,923,619	*72,732	39,761,205
65	Iron, pig	Long tons	7,043,384	7,156,782	93,888,309	6,657,388	6,764,572	71,966,364
66	Lead, value at New York	Short tons	166,678	152,080	12,494,178	160,867	145,906	10,585,048
67	Nickel, fine	Pounds	25,893	*11,745	12,429			
68	Quicksilver	Flasks, 76½ lbs	30,164	1,046	1,108,527	30,440	1,056	1,095,840
69	Silver, commercial value	Troy ounces	60,500,000	*1,881,550	47,311,000	49,846,875	*1,550,238	31,403,531
70	Zinc spelter	Short tons	76,255	69,178	6,214,782	74,004	67,135	5,209,882
	Total metals				232,370,022			194,092,119
	Est. products unspecified				6,000,000			5,500,000
	Grand total				615,887,108			553,352,996

(a) Including brown coal, lignite. (e) Estimated. * Kilograms.



Gould Pilot-Coupler and Buffer.

RAILROAD GAZETTE

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At 32 Park Place, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The condition of the eastbound freight agreement seems, at this writing, to be unreportable. Refusals and diversions of freight and payments of money penalties are reported in considerable numbers, and the reporters of the daily press assert that these transactions are accompanied by great friction, but the officers of the roads claim otherwise, and it seems probable that after the statistics for the month of May have been fully made up and reviewed by all interested, some definite results from the new agreement will be shown. The gossips say that the Chicago & Grand Trunk was short 40,000 tons, the Michigan Central ahead 25,000 tons, and so on. Such large inequalities must have been several months accumulating, and it cannot be regarded as surprising if the attempt to even up within a few weeks disturbs the shippers somewhat. The Trunk lines are reported as trying to arrange a division of westbound freight on the plan adopted for eastbound, but officers of the Lehigh Valley say that they will not accept the 8.8 per cent. allotted to them. The most hopeful item in the traffic news of the past week is the report that the Chesapeake & Ohio has joined the Trunk Line Association. That road has taken large quantities of European freight to Newport News, especially corn, and has been in a situation to underbid every other line, thereby making itself the most disturbing element in the whole camp. As President Ingalls of that road also controls liues through to Chicago & St. Louis, optimistic people see in this action ground for expecting a decided improvement in the whole eastbound rate situation; but as the present conditions would not be astonishingly rosy even if the Chesapeake & Ohio Railroad were blotted out, it will not be well to count upon any alarming jump in the prices of Trunk Line stocks.

The wholesome doctrine that a new railroad should not be built parallel to an existing line, or, in fact, anywhere else, until an impartial and expert authority, established by the state, shall have decided that it is needed, has just been sustained by the New York Supreme Court, in a decision which appears in another column of this paper. This subject is an important one in every state; and, adopting the theory of President Cleveland, in his advice to the democratic editors of New York, that their state ought to disseminate political and other wisdom of such a quality that it would be in demand throughout the Union, we commend this decision to all our readers. The New York railroad law (section 59) has just been amended so that the requirement which this decision deals with applies to street surface railroads; so that henceforth no railroad of any kind can be built in the state without the Commissioners' certificate of necessity and convenience. A law of this character places a great responsibility upon the railroad commissioners. In fact, there must be many cases in which doubtful or conflicting interests make it impossible to decide just what the public good does require. But this condition makes the law all the more necessary, for the first need in such a case is a lucid statement of all the circumstances affecting it, so that public sentiment so far as it affects the questions at issue, may be intelligent. In the Gloversville case, now decided, we had hoped that the Commissioners would make a detailed investigation, so as to fortify their decision by a strong report setting forth just how and why the existing railroads deserve to be protected from further competition. Quite likely they found that the public demand for an additional line was not of enough consequence to require so elaborate an answer, but the rest of the world would like to see the subject thoroughly discussed.

The American Railway Association has altered Rule 99, the flagging rule, in a radical manner, abandoning the attempt to make a rule that shall provide for all the variations in practice which are found necessary by the flagman who thoroughly protects his train under all circumstances. This change has been under discussion at two or three meetings, and a sketch of the reasons for making it, by Mr. Anderson, one of the experts of the Pennsylvania Railroad Train Rule Committee, is presented in another column. We have no fault to find with the members of the committee. Probably the wisdom of Solomon and the 'cuteness of half a dozen Philadelphia lawyers could do no better at the present time. No one rule could be made that would apply to all circumstances, and every superintendent who would get along with one rule, or even with three, was, and still is, obliged to either make a rule that frequently ought not to be carried out, or else one so brief as to necessitate the exercise of individual judgment by the flagman (or the conductor) in regard to distances and times in many cases. In this dilemma the Committee of the Association has chosen the latter alternative and the Association has confirmed the choice. Unless the Association was ready to make a half dozen rules, adapted to different conditions, this was the only course that it was possible to take. But it is still in order to remember that this action throws away the best feature of the Train Rule Committee's work, which, for 10 years, has been the putting of rules into the most intelligible shape. The present rule does not mark any advance in practice or in uniformity. It indicates precisely what was recognized as the best practice 20 or even 40 years ago. It is not too much to say that, in view of the difficult nature of the problems involved, train rules inherit defective constitutions; and the value of a train rule committee is in its ability to take clumsy rules and make them over into clear and simple ones. The individual manager or superintendent is under the same pressure as before to make written rules for his flagmen; but he is not now invited, as he was, in effect, before, to bring his imperfectly expressed rule into the convention and have its defects corrected. Of course, managers generally will not be content to use Rule 99 in the brief form now adopted. To do so implies that extensive oral instructions shall have been given, or that every flagman is to be closely watched by the conductor. And even if such oral instruction were sufficient and had been given, we come right back to the original question; for uniformity of language—or, at least, perfect clearness—is necessary in giving oral instrutions. If we do not want a uniform flagging rule, we want uniform language and terms for the use of instructors, and a committee of the American Railway Association has proved to be the best source from which to get such uniformity. If the Association leaves Rule 99 in its present brief form, it will encourage slovenly language in flagging rules. This action has been taken to permit diversity in flagging practice; but in effect it at the same time encourages a diversity in the language of flagging rules which means, practically, deterioration.

We say we find no fault with the committee; but there is an obvious criticism to be made on the paragraph about the return of the flagman. The rule as adopted plainly implies that the man need not put down torpedoes until he is about to come in. It is true that each road will probably make rules telling him to do otherwise, but this implication will still stand there to puzzle the flagman. If it does not stand there, if it is cut out, the theory of enunciating principles will have been badly damaged. Since writing the foregoing paragraph we have read the remarks made by Mr. Sullivan, Mr. Metcalfe and others at the St. Louis meeting. The criticisms presented by Mr. Metcalfe are based on sound reasoning. if we are going back to the position that nothing is absolute except God and the decalogue, the first 34 words are all that it is safe to retain of the first paragraph. The whole discussion only serves to show, more clearly than ever before, that if the Association is going to enunciate principles only, it should not pretend to call the result a code of rules, but rather a manual for guidance in the construction of codes of rules It is to be presumed that the members of the committee will now go home and make suitable and sufficient flagging rules, each for himself; and as the nine members represent diversified conditions, their nine codes, taken together, should constitute a good example of the flagging rules that ought to prevail in this country. And as the American Railway Association exists for the purpose of promoting good practice on American railroads, why should it not take these nine good flagging rules and lay their merits before the ninety and nine other roads which, we may be sure, will have poor ones? A member said at the meeting that to try to meet the needs of the majority in this matter would tend to break up the association; but it seems to us that breaking up is much more liable to result from the opposite course—the preparation of rules (or principles) so simple that a convention of ministers or ticket scalpers could easily match them.

The Standard Code at St. Louis.

The first part of the Standard Code of train rules (Rules 1 to 121) received a pretty thorough overhauling at the St. Louis meeting of the American Railway Association, April 17 and 18, and the official report of the discussion is just out. Rule 99 was taken up first (the committee evidently feeling that the vote on that would indicate the temper of the meeting as to the rest of the changes) and the action taken on that rule is briefly discussed in a preceding paragraph. The change in rule 99 was adopted by a vote of 54 to 13; and the impression given by a perusal of the proceedings is that it was adopted without full and free discussion. The discussion was broken off for the noon recess and on reassembling the meeting called loudly for the question, and the vote was taken, though the forenoon's discussion had not settled anything.

The other recommendations of the committee were adopted by majorities as large or larger, the only exceptions being in Rules 66 (by including the bell with the whistle); 69 (by omitting reference to tunnels and streets), and 86 A. In the last named the "A" is expunged and the paragraph becomes a part of Rule 86; and the number of minutes is left blank. The report as printed had too many words in full-faced type. The intention of the committee is to retain this type in only two rules, Nos. 21 and 83. (It seems to us that full-faced type is no more appropriate in 83 than in 121).

The points brought out in the discussion of Rules 30, 31, 86, 90, 92, 95 and others, confirm us in the view expressed in connection with Rule 99. The objections presented by Messrs. Metcalfe, Ramsey and others were not sufficiently considered. The propositions of Messrs. Myers (regarding Rule 90) and Frey (regarding Rule 95) were rejected too summarily. Quite likely the limitations of time and the intricate nature of the questions discussed made it impossible to do any better in such a large assemblage, but there can be little doubt that the result of the action taken will be to introduce additional and undesirable diversity into the codes of the country. As stated by the Chairman of the Train Rule Committee, numerous managers have been waiting to revise their codes; but if they took part in this discussion, or have read the report of it, they will be prompted to take independent action in dozens of places where before they would have stuck to the standard. And in saying this we do not overlook the fact that the great majority of the changes made by the committee are excellent.*

The rule (or tradition) that the American Railway Association shall not set up any standard that is in advance of the practice of the great majority of its members, even for the purpose of looking at it, evidently caused the committee as much embarrassment as anything. This was illustrated in the discussion about first, second and third class trains, as referred to in rules 86 and 92. As was suggested by Mr. Metcalfe, the committee could do a valuable service by promulgating a good rule for regulating the relations of all the different classes of trains to each other; and a rule on this point, or even two or three alternative rules, would not damage the traditions any more than did similarly disputed rules that were adopted by the Association six or eight years ago. Rule 31 is another which the committee might well have amplified.

The question of phraseology, pure and simple, evi-

* Many of the alterations in the rules are simply improvements in phraseology which could not be shown here except by printing the whole rule. We note some of the more prominent changes, other than those above referred to. Rules 7, 8 and 10 are omitted, as out of place in a code of train rules. For rule 20 three forms are prescribed to suit the conflicting views of different roads. The second paragraph of rule 31 is omitted. Rule 67 is omitted, though no reason is given for the omission. Rules 77 and 78 are omitted. Rules 96 and 97 are omitted, new rule 99 covering the substance of these. Rules 100, 101 and 102 are cut out and new rule 102 reads: "When it is necessary for a train on double track to cross over to the opposite track, a flagman must be sent out with danger signals, as provided in Rule No. 99." Rules 115, 116 and 118 are omitted as non-essential.

dently cannot be successfully dealt with in a large gathering. In the excitement of debate the most skillful experts in the art of putting things seem to forget their cunning, and the individual who has a lucid expression at the end of his tongue generally sits quiet until the discussion has gone too far. Every discussion of phraseology is muddled by propositions to change the substance of the rule under discussion, and all hands soon find their patience exhausted. It seems to us that a few prizes for competitive papers might furnish a happy solution of this difficulty and save the committee much work. There are hundreds of trainmasters, dispatchers and others who would be glad to try their hands at polishing the language of the rules for the chance of a $100 prize. Parsing and analyzing were ridiculed by one speaker in the convention, and it is easy enough to say that this feature of the subject leads us into childish hair-splitting; but the fact remains that it does take up valuable time in the meetings and a large share of the time of the committee. Take, for instance, Rule 95, which was discussed at great length at St. Louis. A comparison with Rule 105 at once suggests the way to settle the differences that caused the discussion, and if the task of correctly phrasing the rule were assigned to 25 bright subordinate officers, some one of them would be sure to submit a rule that would be approved without a moment's discussion.

Rule 95 also illustrates the futility of trying to enunciate principles while at the same time adhering to the brevity which everyone seems to deem necessary in rules. Every man in the convention knew just what he wanted to say in Rule 95, but no one would come out and say it, because it was plain that it would require 150 words instead of 40; but the rule never will be right until it is made precise, even at the expense of brevity. Likewise Rule 30. The principle in that case is, that torpedoes should be placed far enough apart to make distinct detonations, and not any farther apart than is necessary for that; but in trying to say this and also make a rule, the matter was left in a shape to satisfy nobody.

The State of the Law Regarding Safety Appliances.

Perhaps the majority of railroad officers have kept in mind the fact that the law requires two things to be done for the safety of employees on and after July 1, 1895. According to the "Act to Promote Safety of Employees and Travelers," passed by the Senate and House, February, 1893, the provisions for a standard height of drawbar and for the use of secure grab irons or hand-holds go into effect the 1st of July. Railroad companies not carrying out these provisions are liable to a penalty of $100 for each violation, which may be recovered in suit brought by the United States District Attorney in a District Court of the United States. It becomes the duty of the Interstate Commerce Commission, under the law, to lodge with district attorneys information of violations.

The law authorized the American Railway Association to designate to the Interstate Commerce Commission a standard height for freight car drawbars. This was done formerly by the Association by resolution of Oct. 12, 1893. The action of the Association was adopted by the Interstate Commerce Commission and due notice sent out to the railroad companies. The Association fixed the standard height of drawbar at 34½ in. from top of rail to center of drawbar, and the maximum variation to be allowed between drawbars on empty and loaded cars at 3 in. (the M. C. B. Standard.) This is for standard gage roads; for narrow gage roads the height is 26 in. and the maximum variation still 3 in.

The grab iron provision of the act is simply that on and after July 1, 1895, until otherwise ordered by the Interstate Commerce Commission, it shall be unlawful for any railroad company to use any car in interstate commerce that is not provided with secure grab irons or hand holds at the ends and sides. Violation of this provision carries the same penalty as in the matter of drawbars.

Oct. 17, 1894, the American Railway Association adopted certain standards for hand holds and grab irons. Box and stock cars should have two iron or wooden ladders, with not less than five steps each, the steps to be not less than 2¼ in. from side or end of car. The M. C. B. "recommended practice" of 3½ in., was last year changed to 2½, and otherwise the Association standard conforms to that of the M. C. B. Association. viz. A hand hold, on the roof, directly over the top of the ladder. When iron ladders are used on ends of cars the bottom step must have a guard to prevent slipping. When a ladder is placed on the end of a car a hand hold should be placed on the opposite side or end from the ladder, and when the ladder is on the side two such handles should be placed on each end of the car about 24 in. above the bottom of the sill. For cars not equipped with ladders two hand holds should be attached to each end sill with at least 2 in. clearance behind them. All other hand holds should have at least 2½ in. clearance. The hand holds should be made of iron not less than ⅝ of an inch in diameter. On sides and ends of cars they should be at least 2 ft. long in the clear. On end sills they may be shorter when it is impossible to use 2 ft.

These are the provisions of the Association; nothing is said about methods of attachment. In case of a lawsuit the Commission and the courts would doubtless accept the Association's standards as governing the requirements.

The act further provides that any employee injured by rolling stock not complying with the provisions of of the act "shall not be deemed to have assumed the risk thereby occasioned, although continuing in the employment of such carrier after the unlawful use of such locomotive, car or train has been brought to his knowledge." In other words, the act aims to upset in this particular the common law rule and practice. It is not at all certain that this part of the act can be sustained, but at any rate it is efficient enough to give trouble to railroad companies in defending suits brought under the act, and much the simplest and cheapest way would doubtless be to comply with the requirements of the law as promptly as possible.

Other important provisions of the act do not go into effect for two years and a half yet; that is, after Jan. 1, 1898, locomotives engaged in interstate traffic must have power driver brakes, and must be equipped for operating power train brakes, and after that date it will be unlawful to run any train in interstate traffic that has not enough cars equipped with power or train brakes to enable the engineer to control the train without the use of hand brakes. After Jan. 1, 1898, it will be unlawful, also, to use in interstate traffic any car not equipped with "couplers coupling automatically by impact, and which can be uncoupled without the necessity of men going between the ends of cars." Any carrier engaged in interstate commerce having enough cars equipped to comply with the provisions with regard to brakes, may lawfully refuse to receive from connecting lines cars not so equipped with interchangeable brakes.

We assume that most railroad officers who are in a position of responsibility with regard to these matters are familiar with the requirements of the law, but we have thought that it would be a matter of interest to refresh their memories. This is especially so if the Interstate Commerce Commission proposes to pursue the matter sharply, as is reported from Washington.

The Rules of Interchange.

Unless all signs fail the most important and the most hotly contested measure to be considered at the M. C. B. Convention will be the revolution in the rules of interchance. The project which is brought forward, and which seems to have a powerful backing, is known as the Chicago plan, and in order to have a convenient name we may as well call it so. It should be remembered, however, that the movement which has culminated in this plan is not local or recent in origin. The aim is to embody in the rules the idea of making car owners responsible for more of the repairs to cars, and to change the theory of inspection from inspection for protection to inspection for safety. These ideas surely are not new, and as much as three years ago Mr. Marden, of the Fitchburg, went on record as advocating that the mileage charged should be sufficient to take care of the running repairs and replace the car when worn out, making owners responsible for running repairs. The Southern & Southwestern Railway Club began working for concerted action among the clubs last November, and to its activity is due a good deal of the interest which is now taken in the movement. But the concrete plan as now in operation at Chicago was formulated there by members of the Western Railway Club and has been tested by the experience of several months, and it certainly is not unjust to speak of this as the Chicago plan. It has been endorsed by the other railroad clubs so generally that we may assume that it will be considered on its merits and that no petty sectional feeling will enter to complicate the treatment of this important subject.

That the rules of interchange as they exist need a radical overhauling will probably be admitted by a great majority of the members. The only question is how to overhaul them. When we see intelligent specialists spending half an hour discussing whether or not the gentlemen who compiled the rules of interchange meant to use "and" when they did use "or," it needs no argument to demonstrate that much of the phraseology is obscure. When we consider that the actual application of the rules in practice must be made daily and hourly by men who are not highly trained in the subtleties of language, and men who are liable to be governed by small local interests, and in whose minds there must often be a conflict between the sense of justice and the sense of what the general manager expects, it is apparent that simplicity and absolute precision are of great importance.

In approaching the subject of revision the first thing to do would seem to be to decide upon certain fundamental principles, by which the three interests most likely to be in conflict should be treated. There are three principal classes to be considered. First, there are those who own cars, borrow them, lend them and handle them; that is, the great mass of the railroads of the country. Second, those who simply own cars and let them for revenue; that is, the private car owners; and third, those who neither own, borrow nor lend, but simply handle cars; that is, the transfer companies. When the claims and rights of these three interests have been fairly considered and settled, then the basis of principle will have been established on which the Association can act intelligently, and then each question as it comes up can be measured by the principles accepted. The rules as they stand have grown without much regard to general principles, and they are doubtless affected all the way through by the uninterrupted sparring for advantage which has been carried on by the various parties interested.

No one can doubt that great burdens are imposed upon the railroad companies by the existing rules, and that there are many and varied evils to be corrected. For instance, no one denies that detentions of 24 hours or more are often made by inspectors when cars are perfectly safe to run, because the inspectors must protect their employers from charges for small repairs. The train of consequences following these detentions is well known. It includes the complaints of shippers and consignees, correspondence and telegraphing to find the shipment and to explain, and loss of revenue from cars. Inspectors tell us that an arrangement by which cars should be inspected for safety only would advance freight at times from 24 to 48 hours. Mr. Waitt, of the Lake Shore, in speaking last December of the arrangements between his company and connecting lines, by which carding of cars was abandoned, says that it has "given greater dispatch to cars, avoided disputes, saved a large amount of unnecessary work, kept the cars in service and in good running order to a greater extent than would have been possible under the old interchange arrangements."

But the detentions are only part of the trouble. An inspector of the Fitchburg, speaking of the arrangement between that road and the New York, New Haven & Hartford, whereby interchange is facilitated, says that in the year before this arrangement went into force it cost his company $200 to transfer freight at one point in order to repair cars. Now this charge is "nothing in comparison with what it was and everything is going along very smoothly." Then there is the cost of switching cars back and forth, and, furthermore, the breaking of draw gear and end sills. Mr. Barr, who takes advanced views in this matter, has said that the switchman measures his ability by the amount of damage he can do, which is merely an extravagant way of expressing a well-known fact.

To all these sources of loss and annoyance we must add the cost of the heavy force of inspectors made necessary by the present system, and then there is still another evil, the practice of repairing foreign cars simply for the profit of it. How much of this is done we cannot judge. Certainly very conservative and very well-informed men think that there is a good deal of it. It is not clear that this would be entirely done away with by the proposed new rules, but obviously it will be prevented by the perfect rules if we ever get them.

Of course there is another side to all this. Mr. R. P. C. Sanderson has shown that the present mileage rate is insufficient to cover depreciation and interest and the cost of repairs. The obvious answer to this is that the earning power of a car will be increased by the greater mileage that it will make, and that while greater mileage means greater wear and tear and consequently more repairs to pay for, other elements in charges against a car do not increase with the mileage. This phase of the subject is one that can be treated practically a good deal better than theoretically. Experience only can show how much car earnings are actually increased by less rigorous inspection, and whether or not mileage can be made to pay for the repairs; but it would seem that at worst the mileage rate, or better still, the per diem charge, could be increased until the repair charge was equalized.

The ablest presentation of the car owners' side of the question that we have seen is the paper of Mr. Bowen, of the Swift Refrigerator Transportation Co., read at the April meeting of the Western Railway Club the sum of which is that the private car owner has a right in common law to have his car returned in as

good order as it was sent out, ordinary wear and tear excepted. The only justification for abandoning this principle he finds in the claim that in the long run the hurtful injustice in some instances will be balanced by beneficial injustice in others; that the saving in inspection, accounting, mileage, etc., will be a net gain. He suggests that the result of the adoption of the proposed rules would be to drive his company out of the M. C. B. Association, and then the rights of the company would be determined, not by the rules of the Association, but by the law of the land, under which it could insist absolutely upon its cars being returned in as good order as when received. To this a good many railroad men would reply, "Let them withdraw; we do not need to hire their cars," and in the same discussion Mr. Rhodes told of having recently heard from some car builders the astonishing statement that the cheapest cars they build are for private car lines. When Mr. Rhodes made this statement there were standing on the tracks of the C. B. & Q. 19 new cars from a private owner, the draft rigging of which was "scandalous" and "ought never to have been put under cars."

On the whole, the question is a most complicated one. We have not attempted to state all of the arguments or to elaborate any of them. It seems probable that the Chicago plan will be adopted and undoubtedly it will work considerable injustice at first and be subject to some modification; but it seems on the whole a great improvement over the present system. The end of the whole system may come in the ownership of all freight cars by one vast association, but that result is hardly imminent; and, until it is reached, the railroad companies and private car owners will have to find some plan on which they can live and work together.

The Present Work of the Master Car Builders' Association.

The Master Car Builders' Association assembled at Alexandria Bay, next week will hear reports on brake shoe metals, car lubrication, air-brake triples and levers, vertical plane couplers, mounting wheels on axles, coal car sides, the strength of passenger car ends and platforms and the revision of the Rules of Interchange. Year after year some of these subjects are repeated without reaching definite results, and one naturally inquires if the questions are really so complicated as they appear, or are there individual railroad interests which prevent joint action.

The subjects of couplers and brakes are examples. Since 1887 the spare time and energies of several of the most earnest and active men in the Association have been occupied in reaching conclusions about a fair test for air-brakes and a safe strength for couplers. Last year the committee on the strength of couplers failed to make a recommendation, saying "the committee has confined itself to submitting the results of the actual tests, with such comments only as are required to explain them, leaving it to the members of the Association to draw their own conclusions as to the relative merits of the couplers tested from the data presented." As the members of the Association did not draw conclusions none were drawn, and there is to-day no standard of strength, nor any standard *test* of the strength of the M. C. B. coupler. The committee was not reappointed, and the subject will not come up this year, so far as can be seen from the programme laid down in the *Proceedings* of 1894. This year will be considered the advisability of increasing the shank and adopting a standard yoke for the spring.

Roads that formerly would not receive a carload of links unless a fair sample would stand 95,000 lbs. pull will now receive couplers that will break at 60,000 to 80,000 lbs., and receive them without a test. How long the operating departments will stand the use of unknown connections between cars no one can say, but the complaints have already begun to come in. (See *Railroad Gazette*, April 19, 1895, p. 254.) One road last year put on several hundred cast iron couplers in one lot, and how many more were put on we do not know. There is no restraint to this bad practice, and under the present plan of interchange the road that breaks these cast iron couplers must pay for them. An honorable road will put in a good malleable iron or steel bar in the place of the broken one, but this honorable action will cost about $18 for each two couplers that are broken. Under the proposed new rules the company or car owner that puts in a weak bar will have to pay for it when it breaks, and this is one of the good features of these rules. They certainly do put a premium on good material.

However this may be, there is no reason why there should not be a standard of strength for the M. C. B. coupler. If one is adopted that proves to be too severe it can be reduced. A simple test, if based on judgment, in the light of all knowledge collected and paid for by the railroads, especially by the Pennsylvania, at Altoona, is better than no restriction at all. A standard unlocking gear also could be adopted, and it is not impossible to adopt a standard knuckle and lock, or at least to fix upon certain restrictions that would prevent the use of knuckles that vary from each other so little as to harm no one if made alike. The results of seven years' labor on a standard coupler are not very gratifying when one is brought face to face with about 40 different designs, and more coming.

What goes to make a good safe air-brake has been fairly well known since 1887, but these requirements have not yet been formulated into a standard. And there is creeping into the minds of some a feeling that anything that will stop a car is good enough for a brake. It is, of course, true that it is not now known how to specify all of the desirable qualities of an air-brake, nor will it ever be known. What is known, is that a brake must have certain fundamental requirements, and these can be fixed upon, and thereafter others can be added, as found necessary.

Take the matter of "quick action" and the accompanying greater pressure for emergency stops. Anyone who has had much to do with brakes knows that to avoid shocks, rapidity of action is an absolute requirement, and to get safety to trains and freedom from slid wheels in ordinary service, a greater pressure in emergency applications must be had. Not only is the bare fact known, but the exact rapidity and the necessary greater pressure have been accurately determined. These matters then can be formulated in a standard requirement, and others added later if it is found necessary, The danger of further delay in this is that the real value of the quick action and the greater emergency pressure will be lost sight of, for the reason that most long trains at present are not equipped with air-brakes, and the necessity for quick action at the present time is not emphasized fully in daily practice. A triple valve should wear out at least two freight cars, and it will if well made; therefore when a railroad buys brakes to-day they must be selected for use at least 15 years hence, and therefore should be suitable for the conditions that will then obtain.

Quick action, to be made safe and useful, must be very quick. If it is not quick enough then there would, perhaps, better be a return to the old plain triple, for with it the shocks would be no more than with a slow "quick action" triple, and the cost and repairs would be less. Such a return would, however, be contrary to good judgment and would be going backward. The serious loss of time in the application of the slow brake has led to the adoption of "quick action" brakes in foreign countries. The lessons of the expensive Burlington brake tests were drawn from the data at the time by the most competent railroad mechanical men in this country, and they stand to-day as true and safe as they did when first pointed out. The most important teaching of those tests was that a safe brake for long trains must have a rapidity of application that will prevent shock and must have such a greater pressure in emergencies as will increase the brake shoe friction far above that which it is safe to use in common service so as to give the shortest possible stop when needed and to reduce the liability of slid wheels in ordinary service. There is too little braking force in emergencies, even with the greatest safe increase of pressure, to permit of a reduction below that which was found feasible to attain in 1887. An unloaded train with an emergency brake shoe pressure equal to 70 per cent. of the light weight of the car can be stopped from 40 miles an hour in about 600 ft. on a level track. But the same car fully loaded has but 23 per cent. brake shoe pressure, and it cannot be stopped in less than about 1,700 ft. with the best brake appliances now used. To drop the emergency features of modern brakes and return to the old triple, or its equivalent, would result in a very great increase in the length of the stop, and would introduce shocks that would make it dangerous to apply the brakes suddenly on a long train.

Now that it has been so long known (since 1887) what are the necessary elements of a safe brake, and as no subsequent investigations in the interim of seven years have shown the conclusions then drawn to be in error and further as the tests in other countries than our own have given the same results, there seems to be no good reason why these elements should not be formulated in a standard and adopted by the Association so that the active men who have been tied up in the several reconsiderations of brakes during the past seven years can be freed for more useful and more necessary work in other car matters.

The committee having the brake question in charge this year will probably report on a set of tests which can then be sent to the Secretary for letter ballot. If the proposed requirements cover the two necessary features of emergency brakes for long trains, namely, the rapid action and the greater pressure, they should be adopted so that future workers in the field of brake invention may know what to seek for and be discouraged from making attacks on the utility of the Burlington tests, and be made to understand that brakes having any action that is not safe will not be accepted by any responsible railroad company or private car owner. The long time that has elapsed between 1887 and this year without any formal act declaring the quirements then determined upon to be absolute, has led many to think that the requirements were too rigid, and that the rapid application and greater pressure are not deemed necessary in the minds of even those who made the tests. In other words, some inventors feel that there has been a change of heart and that now any brake that will push hard enough on the shoes will be accepted if the device is simple and the price low enough. For this reason the requirements should receive the formal stamp of the Association.

There is another phase of the brake question that needs serious attention now, and it is being brought out this year by the two brake shoe committees. One of the committees will report on the wear and action of a number of shoes in actual service, and another will give the friction of the same shoes determined by a shop test. What the results will be cannot be written here, but they will be read carefully by those who have an enthusiastic interest in railroad mechanics. It is not to be expected that the tests will show radically different results from those that have been made before, but they have been made with the utmost care and accuracy and will settle once for all the matters of wear and friction. It is well known now that the wear and friction differ greatly with the different shoes. This was shown by Mr. John W. Cloud's report in the M. C. B. *Proceedings* in 1893, page 59. This report showed that 12 cast iron shoes were "worn out" with the same service that caused two steel shoes to be "slightly worn," and that caused four composite shoes of wrought and cast iron to be "worn out." Other tests have shown that a set of hard chilled iron and hard cast steel shoes will wear out as many as 16 cast iron shoes. Now, on a basis of cost alone, the steel shoe or the chilled shoe is much cheaper than the cast iron shoe and there would be a saving of at least 75 per cent. in the cost of brake shoes by using the hard shoes if it can be found practical to use them.

All that stands in the way of it is the low friction of the hard shoes. As one master mechanic has expressed it, "no wear, no friction." The hard, durable shoes will not stop the train until it has run nearly twice as far as when stopped with a soft shoe; that is, when the same pressure is used on both shoes. If the pressure is increased on the shoe, the hard, durable shoe can be made to stop the train in the same distance as the soft shoe. The difficulties in the way of this are many. Perhaps the most important is that having increased the pressure so that the hard shoe will stop the train as quickly as possible with freedom from slid wheels, suppose a careless car repairer puts on a soft shoe, then the wheels will surely be slid flat. So far as the increase of pressure *per se* is concerned, there are great difficulties. The train-line pressure is now fixed at 70 lbs., and to increase it would be to get into trouble with cars already in service with soft shoes, and cause more trouble from leakage and burst hose. The 8-in. brake cylinders have been put on a vast number of cars, and they cannot be taken off and changed without great trouble and expense. The brake levers under the cars have the fulcrum holes so near one end now that it would approach the unmechanical to bring the fulcrum nearer the end holes in the levers. The brake beams are not strong enough as they are now, according to the belief of many who have used them, and therefore no more load can safely be put upon them.

Taking all these things together, it would appear that it is not feasible to try to gain any more brake-shoe pressure on cars now running than that given by a total braking pressure of 70 per cent. of the light weight, which is the present common practice. On the other hand, to use the hard, durable shoe with present pressures will reduce the holding power of the brakes fully one-third, and this reduces the braking pressure to about 14 per cent. of the loaded car, and would make the length of a stop of a loaded train nearly one-half a mile from 40 miles an hour. These are the horns of the dilemma; either a reduction of the braking force or the use of the more expensive medium or soft cast-iron shoe. "Hard," "medium" and soft cast iron are not far apart in friction and wear, and what is ordinarily called "hard" cast-iron has much friction, almost as much as soft cast-iron, and wears somewhat less "Hard" chilled cast-iron is very durable, and has but little friction. Some refrigerator and special furniture cars are very heavy, and if provided with 70 per cent. of the light weight as the total brake-shoe pressure, have so much travel of piston for each $\frac{1}{16}$-inch of wear that it is often necessary to take up the slack 12 times in wearing out one pair of shoes, and the spring-

ing of the brake beams causes so much piston travel that the pistons often bottom in the cylinders; and it is said by some that such cars seldom do their full share of braking in stopping a train. The Association of Railway Air-Brake Men has recommended that larger cylinders be used on such cars.

The brake-beam is a factor that will need attention soon, for the reason that many of them, while stiff enough at the start, take a permanent set after service and do not fulfill the M. C. B. requirements for deflection. The beams are good in design, but they should be heavier. Many matters of this sort have been brought out by the Air-Brake Men's Association this year, and if the standard requirements for air-brakes can be fixed upon this year it would perhaps be wise to take up the whole apparatus together and see what will then be the combined results of the brake standards that have been adopted in piecemeal.

Although there was much hard work done last year by the committee on the placing of wheels on axles, there are still some who are not satisfied with what was done, and when the subject comes up this year it is expected that there will be shown some of the errors that ignorant men are liable to be led into by the present system of gages.

The lubrication of cars is perhaps the subject that will be presented in the way that will point out a greater possible money saving than any of the others. Some roads use oil that costs 28 cents a gallon, and other roads use oil at five cents. Some deal out oil and waste separately, and others give only waste saturated with oil. The result of this difference in practice is a difference in the cost of oiling of over 50 per cent., and one road by taking all practical precautions has lately saved $150,000 in one year. These being the practical facts, the report of the committee will be read with much interest by some who are not mechanical men on railroads.

It is never to late to mend a bad practice and if the report on car ends and platforms has the effect of opening the eyes of some car men to their negligence in providing for the safety of passengers by omitting to use a little iron and steel in the ends of cars, much good will eventually come of it. The new edition of the *Car Builders' Dictionary* well illustrates the bad and good practice in this construction.

Coal car sides is perhaps the subject af the least vital importance of all that will come up, but it is a matter that perplexes a good many car men. Radical changes alone will give the strength that is sought, and the stakes that stay the sides must be made more in keeping with the strains they have to bear before it can ever be hoped that they will maintain a verticle side.

In Interchange matters there has never before been such a strenuous attempt to get relief from the mass of perplexing situations that are now arising at interchange points. Concerning this we have written at more length in another column. The situation as summed up by Mr. J. N. Barr in another column is a difficult one to understand in its full bearing and hard to find a remedy for. Conflicting interests prevent ready acquiescence by all in the new proposed plan, and how these interests can be brought together is not clear. The new plan from the standpoint of an outsider is a good one, and has the merit of reducing the delays to cars and putting a premium on the use of good material. The point to be discussed is the proposal to make car owners responsible for about all defects that are not the results of wrecks. This will do away with the annoyance about the responsibility for defects that appear to be "old defects" and for which the receiving road often demands a M. C. B. defect card from a delivering road and which is often refused on the ground that the defects are old and the owner should be held responsible. The large roads do not all agree, and there will be a lively discussion. Probably in the end the new plan will be adopted in its present form or an equivalent modification of Rule 8, which is the rule relating to the parts for which owners are responsible.

The Hartford bridge matter continues in a complicated condition, and it is said that a resort to the courts will probably be necessary in order to harmonize the conflicting interests. This ancient bridge, connecting Hartford with the towns on the east side of the Connecticut River, was supported down to 1893 by the five towns most interested, Hartford, East Hartford, Glastonbury, South Windsor and Manchester; but in that year the legislature passed a law taking the bridge out of the hands of the towns and placing the burden of its support upon the State. It is alleged that this action of the legislature was procured by corrupt methods. After an attempt in this year's legislature to expose this corruption a law was passed, which has now been approved by the Governor, placing the bridge back in the hands of the five towns. In the meantime the bridge has been burned and the Berlin Iron Bridge Co., with whom the State had contracted for a new iron bridge, is finishing its false works for use as a temporary bridge. The law now passed seems to have been intended to repudiate the contract with the Berlin Co., but a provision was finally inserted authorizing the appointment of a special commission of three men to settle with the bridge company, though they are not authorized to pay out more than $40,000. If the Bridge Co. is not satisfied with the Commission's award, it may sue the State. There is a further provision that if the contract is held valid by the court, the State Controller shall go on and have the bridge built. Subsequently, the legislature passed another law directing the five towns named to establish a bridge commission. This commission is to have power to issue bonds up to $500,000 and is to receive half of the tax received by the State from electric railroads crossing the bridge.

One of the large Western roads which has under its control numerous divisions and branch lines, each operating its own shops, has followed an excellent plan for distributing information concerning the different tools used in the various shops. Each master mechanic has, of course, from time to time added such tools to his equipment as he thought would aid in the repairs and construction of the locomotives and cars, and, many of these being his own ideas, the knowledge of them did not necessarily extend to the other shops. Not long ago it was decided to make an inspection of all the shops and extend the information thus acquired to all the master mechanics so that all might profit by the experience of the different men. In doing this a plan was followed, which could be adopted with advantage by other roads. A committee was formed which visited all the shops and took photographs of the different tools they saw. These photographs were mounted on sheets of paper and numbered, a short description of each tool being written beneath the photograph. Those taken at the separate shops were grouped and copies of every set were made and sent to each master mechanic. Photographs were used instead of drawings, as it was thought that they were better suited to the case, affording a better knowledge of the general appearance of the tools than drawings would do. Each master mechanic is thus enabled to acquaint himself with the practice of the different shops, and if he wants more detailed knowledge of any tool he has only to write for drawings, referring in his letter to the number given to the photograph. The Superintendent of Motive Power of the road has expressed himself very favorably as to the results obtained.

The New Orleans freight bureau has now been in existence a year and a half, and the manager gives out a statement showing what it has done in that time. This statement contains 42 paragraphs, each naming some particular rate reduction or other advantage secured by the bureau, and many of these reductions are quite large. Not a few of the items state that an advance on such and such commodities was made from some other large city to territory where New Orleans sellers compete. One item was the waiving of five days' demurrage charges during the unprecedented weather of February last. We have no doubt that this list justifies the existence of the bureau. Transportation rates are now so complicated that a central office for dealing with the railroads must be highly advantageous, if not absolutely necessary, to any large body of merchants like the wholesalers of a big city. But in giving the New Orleans bureau the sole crdit for these dozens of rate-reductions, some of which affect other cities much more than they do New Orleans, the local reporter probably has allowed his local pride to carry him too far. The Bureau may well point with pride to the list if it has been the means of accomplishing even half the results named.

The provision of the New York State Constitution prohibiting the use of free railroad passes by State officers has again been made the subject of a judicial decision, this time by the Court of Appeals. It is in the case of William J. Dempsey, a policeman employed and paid by the New York Central & Hudson River Railroad, who used an annual pass in riding on the trains of the company, the granting of the pass being a part of his contract. On the adoption of the new constitution the company refused to issue the pass, on the ground that Dempsey was a public officer, and action was brought in a local court at Syracuse to compel its issue. The Court held that Dempsey was exempt from the constitutional provision, and this opinion is now sustained by the highest court of the State. This decision would seem to provide a very convenient loophole for State Senators and others who are also attorneys for large railroad companies.

It is reported that the contest between the Seaboard Air Line and its competitors has been settled, the Southern Railway Association agreeing to rescind the order prohibiting through billing and ticketing with the Seaboard Air Line and the latter agreeing to restore the rates which it severely reduced three months ago. The Seaboard Air Line entered a suit in the United States Court at Macon, Ga., to compel the Association to cease its "boycott," and the case was to have been tried on May 31, but the attorneys held a conference on that day and reached the compromise reported. Particulars are not given out, but it is said that both sides made concessions. The Seaboard Air Line has not agreed to join the association.

TECHNICAL.

Manufacturing and Business.

The J. A. Fay & Egan Co., of Cincinnati, have received notice that the officers of the International Fair at Santiago, Chili, have awarded the firm the first prize for its exhibit of wood-working machinery at that fair.

The Berlin Iron Bridge Co., of East Berlin, Conn., are the engineers and architects for the large three-story steel frame building which the Union Metallic Cartridge Co. is now putting up at Bridgeport, Conn.

The Car Trust Investment Co., of New York City, has been organized at New York City, with a capital of $5,000, by Thomas Carmichael, M. F. McLanahan and G. W. Snow, of New York City.

The Westinghouse Air-Brake Works at Wilmerding, Pa., are running with a larger force at present than for many months. The men in all the mechanical departments are now employed 13 hours a day four days a week These works are especially busy on triple valves; the brake department is also running overtime.

The firm of Small & Biggar, consisting of J. Francis Small and John S. Biggar, designers of special machinery and electric devices, now has its office at 1525 Monadnock Building, Chicago. They have recently completed the invention of an automatic electric railroad gate, and one of the gates is now being erected on an important railroad running into Chicago.

The Bushnell Manufacturing Co., Easton, Pa., manufacturers of car seats, patented springs, etc., has, in addition to its regular business, contracts to equip the following electric roads: Burlington & Mt. Holly Branch, Pennsylvania Railroad Co., reversible plush seats; Pasadena & Pacific, Los Angeles, Cal., patented reversible seats in plush; Orleans Street Railway Co., New Orleans, La., rattan spring seats and backs; Syracuse Consolidated, Syracuse, N. Y., spring seats in rattan; Kansas City Railway Co., Kansas City, Mo., reversible plush seats; Portland Railroad Co., Portland, Me., longitudinal spring seats; Natick & Cochituate Railway, Natick, Mass., longitudinal seats and backs; Cleveland Electric Railway, Cleveland, O., spring seats in rattan; Detroit & Mt. Clements, Detroit, Mich., reversible rattan seats; Cleveland & Elyria Railway, Cleveland, O., reversible plush seats; Akron, Bedford & Cleveland Railway Co., Cleveland, O., reversible plush seats.

The A. H. Zenner Co., of Detroit, Mich., which controls the Zenoleum disinfectant for passenger cars, has recently received orders for that material from the St. Louis & Southwestern Railroad and the Grand Rapids & Indiana Railroad in Michigan.

The National Paint Works, of Williamsport, Pa., has recently shipped some large orders from its plant at Williamsport, including a carload of paint for the Guatemala Central Railroad in South America and material for repainting the Ohio River bridge at Louisville, and a considerable amount of bridge work on the Philadelphia & Reading Railroad.

Mr. James H. Sewall, widely known from his connection with the car heating business, has just commenced the manufacture of the Standard Automatic Brake Slack Adjuster. This device was illustrated and described in the *Railroad Gazette* April 19, 1895. The adjuster is not the invention of Mr. Sewall, as stated by one paper recently, but was invented by Mr. Frank Robinson, Master Mechanic of the Maine Central at Bangor. The device has been in continuous service for over a year on a car of the Boston & Maine, and is giving excellent satisfaction.

Mr. Sewall has established a factory at 100 Exchange street, Worcester, Mass.

The Rochester Lamp Company, of New York City, has recently received some large orders for its street and station lamp which was illustrated in our issue of July 27, 1894. Among the larger firms ordering the lamp are the Simmons Hardware Co., St. Louis; Hibbard, Spencer & Bartlett, Burley, Tyrell & Co., and Montgomery Ward & Co., of Chicago; C. Eissfeldt & Co. and John Pritzlaff Hardware Co., of Milwaukee; Farwell, Ozmun & Kirk Co., Ogden; Merrell & Greer and Janney, Semple & Co., St. Paul; Krenning Glass Co., Missouri Glass Co. and E. F. W. Mier, St. Louis; Richards & Conover Co., Kansas City; Wyeth Hardware & Mfg. Co., St. Joseph, Mo.; Rector Wilkelmy Hardware Co., Omaha, Neb.; Nathan & Dorman, San Francisco, and Myberg Bros., Los Angeles. The Rochester Lamp Company has also recently received orders from several railroad companies.

The directors of the American Steel Castings Co. have recently declared a dividend of 3½ per cent. on its preferred stock, payable June 29. The plant of this company, at Norristown, Pa., was recently started up and it is at present operating six of its plant located at Thurlow, Norristown, Pittsburgh, Sharon, Pa., Alliance, O., and Syracuse, N. Y.

The sale of the Green Island car shops of the Gilbert Car Manufacturing Co., at Troy, N. Y., under the foreclosure decree of the court, has been fixed for July 2 at the company's office at Green Island, N. Y. The property has been under the control of William Shaw as receiver for several years and the plant has been kept in good condition. The Gilbert Car Manufacturing Co. was for many years one of the best known car builders in this country. The Green Island plant is desirably located, being reached by the tracks of the Delaware & Hudson and a navigable branch of the Mohawk River connecting near by with the Hudson River.

CAR ORDERS IN 1895.

RAILROAD.	Number.	TYPE.	BUILDER.
Atlanta & West Point	100	ventilated fruit	St. Charles Car Co.
American Car Co	30	platform	Madison Car Co.
Armour & Co	700	refrigerator	600 to Wells & French Co.; 100 to Mo. Car & Fdy. Co.
Boston & Albany	9	coaches	Pullman Car Co.
	4	parlor	
	2	baggage	
Balto. & Ohio S. W	300	stock	not awarded.
Buff., Roch. & Pittsburgh	200	coal	Union Car Co.
Boston & Maine	600	200 coal; 200 box; 200 platform	not awarded.
	9	passenger	Pullman Car Co.
Clev., Cincin., Ch. & St. L.	200	30-ton platform	Indiana Car & Fdy. Co.
	200	30-ton stock	
	100	platform	Terre Haute Car & Mfg. Co.
	4	postal	Pullman Car Co.
Columbus, H. V. & Toledo	1,000	30-ton gondola	
	100	side dump coal	Mich.-Peninsular Car Co.
Concord & Montreal	2	parlor	Barney & Smith Car Co.
	4	coaches	Laconia Car Co.
Chic. & So. Bend	50	furniture	not awarded.
Choc., Okla. & Gulf	500	stock	not awarded.
	10	passenger	
Clev., Lorain & Wh	100	coal (60, 00 lbs.)	Mich.-Peninsular Car Wks.
Campbell House Car Co	15	comb. box	So. Baltimore Car Wks.
Chic., Pad. & Memphis	200	freight	not awarded.
Central of Georgia	100	ventilator box	railroad shops.
Calif. Fruit T. Co	200	refrigerator	Wells & French Co.
Cold Blast T. Co	100	refrigerator	Mo. Car & Fdy. Co.
Ches. & Ohio	100	patent stock	Ensign Mfg. Co.
Chilian Gov't	100	50 refrigerator; 50 stock	Union Car Co.
Duluth & Iron Range	500	ore	300 to Pullman Car Co.; 200 to Duluth Mfg. Co.
Davenport S. R. Co		tank	Memphis Car & Fdy. Co.
Dold Packing Co	100	refrigerator	Mo. Car & Fdy. Co.
Del. & Hudson	150	freight	Jackson & Woodin Mfg. Co.
Duluth, Missabe & Nor	200	ore	Pullman Car Co.
Dela., Lack. & Western	500	coal	Jackson & Woodin Mfg. Co.
Evansville & T. Haute	75	box (50,000 lbs.)	Ohio Falls Car Co
Farrell & Co., Omaha	30	tank	Memphis Car & Fdy. Co.
Flint, Eddy & Co. (for exp't)	275	coal, platform and box	Bloomsburg Car Co.
G. Fowlers' Sons Co. K. C.	50	freight	not awarded.
Fall Brook Coal Co	200	coal	not awarded.
Galves'n, La Porte & Hous'n	100	box, stock and coal	St. Charles Car Co.
	9	passenger	
Hydraulic Pressed Brick Co.	40	coal	
K. C. Refrig. Co.	58	refrigerator (34 ft., 60,000 lbs.)	St. Charles Car Co.
K. C. Osceola & Southern	25	gondola	
Ind., Dec. & Western	3	passenger	Pullman Car Co.
Illinois Central	1,000	freight	Haskell & Barker Car. Co.
	300	refrigerator	
K. C. Provision Co	50	refrigerator	not awarded.
Live Poultry T. Co	38	poultry	Ohio Falls Car Co.
Louisv. & Nashville	950	500 box; 400 gondola; 50 ore	300 to Elliott Car Co.; 650 to Mt. Vernon Mfg. Co.

RAILROAD.	Number.	TYPE.	BUILDER.
Monterey Mining Co	50	ore	Ryan & McDonald.
Merchants Desp. T. Co	500	36-ft. refrigerator	150 to Mich. Penin. Car Co.; 350 to Union Car Co.
Missouri, Kan. & Texas	2,000	800 box; 700 furniture; 500 coal	Mo. Car & Fdy. Co.; Madison Car Co.
Maine Cent	15	passenger	Pullman Car Co.
Memphis F. Frt. Line	600	box	Memphis Car & Fdy Co.
Mobile & Ohio	100	box	Mt. Vernon Mfg. Co.
Miss. R. & Bonne Terre	100	dump	St. Charles Car Co.
Menasha W. W. Co	10	box	Haskell & Barker Car Co.
Mexican Cent	230	34 feet box	Mt. Vernon Car Co.
Mather Stock Car Co	500	stock	Indiana Car Co.
N. Y., N. H. & Hartford	16	for electric passenger service	Barney & Smith Car Co.
N. Y. C. & H. R	3,000	box cars	1,500 to Buffalo Car Mfg. Co.; 1,500 to Mich.-Penin.
Oliver Coke & Furnace Co	100	coke	Mich.-Peninsular Car Co.
A. Pearson & Son	200	platform	St. Charles Car Co.
Phila. & Reading	1,000	coal	Pullman Car Co.
Pennsylvania Co	1,000	hopper bottom; gondola	500 to Barney & Smith C. Co.; 100 to Union Car Co.; 400 at Altoona shops.
Plant System	5	passenger	Pullman.
Pitts'b. & Lake Erie	500	coal	Michigan-Peninsular.
Phila., R. & New Eng	150	100 coal; 50 furniture	Union Car Co.
Penn. Midland	700	500 coal; 100 box; 100 flat	Murray, Dougal & Co.
Rodger B. Car Co	52	ballast	Wells & French Co.
Southern Ry	500	ventilated, box	350 to Ohio Falls Car Co.; 150 to Elliott Car Co.
	500	coal	Lenoir Car Wks.
	20	passenger	Pullman Car Co.
	4	mail	
	10	express	Barney & Smith Car Co.
St. L., A. & T. H	125	75 furniture; 50 box	Mt. Vernon Car Co.
	760	700 ventilated, fruit; 60 refrigerator	Ensign Mfg. Co.
Southern Pacific	18	passenger	Pullman Car Co.
	525	box	
Savannah, Amer. & M	300	platform	not awarded.
St. Louis, Vandalia & T. H.	100	freight	Indiana Car & Fdy. Co.
Trinity C. & M	200	100 platform; 100 box	Madison Car Co.
Texas & Pacific Coal Co	12	dump	Madison Car Co.
Tex. Midland	66	box, furniture and coal	St. Charles Car Co.
Tol., A., A. & Nor. Mich	560	box	not awarded.
Texas & Pacific	300	box	not awarded.
Union Tank Line	100	40-ft. tank	company's shops.
Unadilla Valley	10	freight	Carlisle Mfg. Co.
Venice Transportation Co	10	60-ft. platform	St. Charles Car Co.
Wheeling & Lake Erie	600	freight	
Wisconsin Central	50	platform	company's shops.

Iron and Steel.

The Phœnix Bridge Co., on May 24, shipped from their works a train consisting of 28 cars containing 700 tons of iron for the structural work of the Lake Street Elevated Railroad in Chicago. Previous to this a train with 26 cars containing 600 tons had been shipped.

The Bethlehem Iron Co., in the week ending May 27, made a record in pig iron making when its No. 6 blast furnace made an output of 1,030 tons of pig iron. Three-eighths coke was used in the manufacture.

An increase of 10 per cent. in wages at the Pennsylvania Steel Works, at Steelton, was announced this week. It means a restoration of the wages paid in 1893, and affects nearly 4,000 employees. The plant is crowded with orders.

The Cleveland & Pittsburgh division of the Pennsylvania lines will erect a new flour house 80 ft. × 200 ft., at Cleveland. The present flour house is 80 ft. × 100 ft., but since its erection the business has been increasing so that a new building is necessary. Last year the receipts of flour at Cleveland by the Pennsylvania lines were 125,000 barrels, and Superintendent Loree says that, with the facilities afforded by the new house, he expects the recepts for this season to reach 400,000 barrels.

The Carnegie Steel Co. has voluntarily increased the wages of all tonnage, day and turn men in its various mills 10 per cent., the advance to date from June 1. About 20,000 men are affected by the increase.

The Cambria Iron Co. has decided to advance the wages of all the employees 10 per cent., to take effect June 17. It is said that the increase will be given to all, including the office force and officials of the company. This new order will add $20,000 a month to the pay roll. The works are running full time and have sufficient orders on hand to keep the mills going all summer. The demand is chiefly for rails. In the last two weeks a number of railroads have placed large orders for rails, and many orders for miscellaneous material given a month ago have been doubled.

The Reading Iron Co., will restore the wages of the men in the tube works department to the basis ruling from April, 1892, to December, 1893. This increase will affect 800 men in that department, and will mean about 10 per cent. increase. The Reading Iron Co. made its last general reduction in December, 1893, and there has been practically no change since then. General Manager Smink says that as soon as the company realizes any benefit in any department from an improved condition of business, proportionate advances in wages will be made.

New Stations and Shops.

On May 24 grading was commenced at Bolton lot preparatory to erecting the uptown station of the Baltimore & Ohio Railroad in Baltimore. A train shed will be built, spanning the open cut at the end of the tunnel at that point, and a station will be built on the eastern side of the line. Contracts for the building will be let in about a month.

The city of Montgomery is anxious to have a new Union railroad station built at that point, and Mayor Clisby has opened communications with President Smith of the Louisville & Nashville to have work begun soon on the new Union station.

New Steel Plant for the Austrian Government.

It is said that a very large steel plant is about to be erected at Cronstadt by the Austro-Hungarian Government. Its erection and management will be in charge of Count Camille Mercador, who has until recently been Chief Engineer of Carnegie's Edgar Thomson Steel Works at Braddock, Pa. It is said that the Austrian Government will spend between six and eight million dollars in constructing this plant, and that it will supply all the rails used on Government roads. The capacity of the new plant will be 100,000 lbs. of finished product per day.

Rapid Transit in New York.

At the regular meeting of the Rapid Transit Commissioners this week Mr. Parsons, Chief Engineer, made a report as to the general manner of operating the road, its equipment and the location of stations. He recommends the use of electricity with motor cars, the running of small and very frequent trains—two, or at most three cars—on the way tracks, and of heavier and less frequent trains on the express tracks. The express stations should not be less than a mile and a half apart. Resolutions were passed instructing the Chief Engineer to prepare detailed plans for construction and operation in accordance with the general plans heretofore adopted.

Electric Car Heating in Switzerland.

According to the *Schweizerische Bauzeitung*, the cars of the Mont Saléve electric rack railroad in Switzerland are heated electrically, the reduced traffic in cold weather period making sufficient surplus current available for this purpose. The heating apparatus of each car consists simply of two resistance boxes, about 33 in. long, 12 in. high and 7½ in. deep, placed under the seats at the ends of the car. Each of these boxes contains 42 galvanized iron wire coils, measuring about an inch in diameter, and having a combined length of about 19 ft. The total length of wire in both boxes amounts to over 1,600 ft. The current for these heaters is taken directly from the conductor rail from which the car motors also are supplied, and the consumption amounts to about 15 ampéres at 500 volts, representing, approximately, 10 H. P. The temperature of the resistance coils reaches about that of boiling water, and from 10 to 15 minutes is sufficient time to bring the interior of a car to a comfortable temperature even on the coldest days. The heaters can be thrown into or out of circuit by a switch on the platform. For a discussion of this method of car heating see the *Railroad Gazette* March 22, p. 184.

Granite and Asphalt Paving.

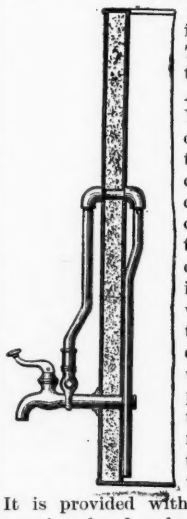
The girders for the Bourse now being built between Market and Chestnut streets, and extending from Fourth to Fifth streets, Philadelphia, were some time ago hauled to the site of the building. Many cross-flags and manhole covers were broken and a rut from ⅛ to ¾ of an inch deep appeared everywhere on the granite paving along the route of the hauling, whereas no trace of the wheels was left on the asphalt paving around the City Hall. These girders weigh about 30 tons each. Of this about 20 tons came on the rear pair of wheels, which had 7-in. tires.

The English Torpedo Boat Destroyer "Fervent."

This vessel, recently launched at Paisley, is 200 ft. long, 13 ft. beam and 280 tons displacement. Her engines are triple expansion, surface-condensing, with a collective horse-power of 12,000 indicated, and her boilers are of the locomotive type placed in two separate water tight compartments and supplied with fans for supplying forced draft. She will carry one 12-lb. quick-firing gun on her conning tower and four 6-pounders on the broadside. There are also two single revolving torpedo tubes on deck and one 6 lb. quick-firing gun on a pedestal aft. The vessel will also carry a powerful electric search light.

Automatic Overflow for Water Coolers.

The excess of water which necessarily collects in the water coolers on railroad cars, owing to the fact that the ice melts more rapidly than the water is used, results not only in increased consumption of ice, but often in splashing of water. To obviate these difficulties automatically, and save labor, Mr. A. Major, of 461 Pearl street, New York, has devised an automatic overflow pipe, which is shown by the engraving. As will be seen, it consists of a siphon pipe, which can be readily applied to existing coolers. The pipe on the inside of the cooler, in the newer forms will be extended down to within an inch of its bottom. In this way, the dead water, mud, etc., which settles to the bottom of the cooler, will be drawn off, making a much purer water available for drinking purposes. This will also do away with the frequent cleaning of the tanks, now necessary. The outer end of the siphon discharges the overflow water into the waste water pan.



It is provided with a stop-cock so that the siphon can be closed, when a larger supply of water is needed, as for instance, on excursion trains. Under ordinary circumstances, when the ice is renewed, the water rises to near the top of the cooler. At once the siphon begins to act, and the water falls to the level of the small hole seen in the engraving, where it stops. The present coolers used would make it necessary for a trainman to stand for several minutes pressing down upon the spring cock, in order to reduce the level of the water sufficiently.

THE SCRAP HEAP.

Notes.

A dispatch from Columbus, O., reports that the Baltimore & Ohio has discharged 17 passenger conductors.

The Northern Pacific reduced the salaries of clerks in its general offices and in some other branches of the service on June 1.

The Niagara & Lewiston Railroad has been authorized by the New York State Railroad Commissioners to increase its capital from $100,000 to $1,400,000. This company proposes to build an electric line along the Niagara River from Niagara Falls to Lewiston, N. Y.

Bills to establish a State Railroad Commission have been under discussion in the legislature of Florida; and such a bill was passed in the House, but in the Senate it has been rejected by a vote of 15 to 8. Florida had a railroad commission several years ago, but it was abolished.

The compressed air locomotive of the American Compressed Air Motor Co., which has been tried on a street railroad in Westfield, Mass., is soon to be tried in Baltimore, Mr. J. B. McDonald, President of the Company, having made an arrangement for experimental trips on the Baltimore, Catonsville & Ellicott City road. Two cars are being built at the shops of Ryan & McDonald at Curtis Bay, near Baltimore.

The inspectors appointed by the Mayor of Brooklyn to watch the electric street cars have made their first monthly report, and it appears that they have observed 152 violations of the speed ordinance on the Brooklyn Heights line, 92 on the Atlantic avenue and smaller numbers on the other lines, aggregating in all 390 for the month of May. The rule requiring cars to stop before instead of after crossing a street has been generally complied with.

The limit of the right of persuasion in a strike has recently been elucidated in a decision by Judge O. W. Holmes, of the Massachusetts Supreme Court. In a case against certain members of an upholsterers' union, it appeared that certain strikers, to prevent their late employer from getting new workmen, kept two walking delegates in front of the factory; and that these "delegates" engaged in conversation with men who wanted to get work. The Court held that it was not illegal to thus patrol the street as long as the patrolmen confined themselves to persuasion not to make contracts and to giving notice of the existence of the strike; but that persuasion to break existing contracts was unlawful.

In a crossing contest between an electric and a steam railroad near Chester, Pa., the former seems to have come out ahead. The proposed electric line was to cross the Philadelphia & Delaware County Railroad, operated by the Pennsylvania, and the latter made objection; on taking the question before the County Court it was decided that the street line had a right to lay tracks for a passenger railway, and that the right existed before the Philadelphia & Delaware County road was incorporated; but the right provided that the motive power should be either horses or steam, and electricity therefore cannot be used; a preliminary injunction forbidding the stringing of wires is therefore sustained. It is said that the electric company will go on laying its rails, with the expectation of coming to some agreement with the Pennsylvania.

South American Notes.

The long pending dispute between Messrs. Punchard, McTaggart, Lowther & Co., of London, and the government of Colombia, is to be settled by arbitration. It will be remembered that it was claimed that the contract by this firm for building the continuation of the Antioquia Railroad was obtained by corruption of officials, and that the sum agreed upon was excessive.

The shipments of Argentine wheat from January 1, to March 31, 1895, amounted to 499,500 tons, and the amount still in stock, and loading reaches another 500,000 tons. Including home consumption the last Argentine wheat harvest is estimated to have yielded 1,099,500 tons.

The Bahia Blanca North Western Railway Co., Argentine, reports for its second year of operation, ending Dec. 31, 1894, gross receipts amounting to $371,227, with working expenses at $316,628, leaving a net income of $54,597, against $2,503 in 1893. The length of this line is 128 miles.

The Buenos Ayres and Rosario Railway, Argentine, operating 911 miles of track, reports receipts for the last fiscal year of $3,060,000, against $2,800,000 for the previous year. The net income was $1,470,000, being an increase of $75,000. The increase has been in freights, with indications of still larger traffic from agricultural products in future.

The São Paulo, Brazilian, Railway continues its favorable record, by showing a net balance as a result of the half year's working ending Dec. 31, 1894, of $995,000. The working expenses were only 33.36 per cent. of the receipts. The length of line operated is 86½ miles.

The Porto Alegre & New Hamburgh, Brazilian, Railway, is also coming rapidly into prominence as a profitable short line, its gains having been progressive since 1890, the receipts for the last year reaching $150,000, with working expenses at $120,000. This company is now operating 27 miles of road.

The Great Western of Brazil Railway, 87 miles in length, also shows an increase of 14.75 per cent. in receipts over 1893, the net balance being $79,000.

The Transandine Railroad, between Chili and Argentine, is now in a fair way of being completed. the Chilian Congress having passed an act providing for a guarantee of 4½ per cent. on a sum of $7,500,000 for this purpose. The guarantee is to continue for 20 years, and is to be paid semi-annually.

Taxation of Interstate Traffic.

The Supreme Court of the United States has affirmed the constitutionality of an act of the State of Pennsylvania imposing a tax of eight-tenths of 1 per cent. upon the gross receipts of common carriers for tolls and transportation. The case came up on a writ of error from the Supreme Court of Pennsylvania. The complainant was the New York, Lake Erie & Western Railroad Company, which claimed that, as all the business done over the road by the lessee party, itself, was Interstate Commerce, it was not competent for the state to tax the tolls received by the company which owned the road. In its opinion, the court holds that the fact that the same corporation which owns the track in Pennsylvania owns likewise a track in New York, does not deprive such company of the right to receive tolls for the use of that part of its road that lies in Pennsylvania, nor the state of its right to tax such portion of the tolls, and that this is what the court below decided.

The Richmond Compound.

The Richmond compound locomotive No. 2427, which has lately made a number of trial trips on the Pennsylvania Railroad, ran from Altoona yard eastward to Harrisburg yard on May 22, drawing 27 loaded cars, in 3 hours, 31 minutes. The distance is 126.5 miles, making the rate 35.97 miles an hour. The grade of this division descends eastward. On the return trip the following day, the engine had 35 loaded cars and the trip was made in 4 hours, 26 minutes or at the rate of 28.53 miles an hour.

Failure of Suit to Annul Pullman Charter.

At the time of the American Railway Union attack on the Pullman Palace Car Co., Atorney-General Moloney, of Illinois, entered suit in the courts of that state asking to have the charter of the Pullman Co. declared void on the ground that the company had violated its provisions by conducting a number of enterprises not authorized by it. On June 1 Judge Baker handed down a decision at Chicago sustaining the company on all points except two; one that the company had exceeded its power in becoming the owner of 23 acres of land in the town of Pullman, which had been put to no use, and the other that it had also exceeded its powers in becoming the owner of a part of the stock of the Pullman Iron & Steel Company. The court holds that the company had the right to erect the 10-story office building in Chicago and rent the greater part of it to tenants; that it has the right to sell intoxicating liquors in its cars, and that in the purchase of land upon which the town of Pullman is built and the erection thereon of 2,200 dwelling houses, to be rented to its employees, the company did not violate its charter, but only took upon itself powers which were implied in the grant of the legislature. The company is also sustained in the erection of schools and a church in the town of Pullman, and the sale, to the tenants of its houses, of water and gas from the plants which the company owns. The two interests in which the company was defeated involved about $50,000.

The Tehauntepec Railroad.

The Mexican Congress has recently ratified the award by the Mexican Government of important contracts, involving a sum of $2,000,000 made with Messrs. Samuel Hermanos, of 54 Broad street, New York City and the City of Mexico, for completing the National Tehauntepec Railroad. The work included in this contract includes rolling stock, bridges, machine shops, tugs and lighters for the harbors, a steamship for lighthouse service and other equipment.

The Tehauntepec Railroad was turned over to the Mexican Government for operation in August last by the contractors, Read, Hampson & Corthell. The work done by them included only the grading and tracklaying on the new railroad, and when the operation of the line was assumed by the Mexican Government the railroad was without adequate rolling stock or proper facilities for handling any considerable through traffic. It has been operated by the Government chiefly for the convenience of the local traffic that is offered. It is estimated that it will require something over $5,000,000 to carry out the plans of the Government for the equipment of the railroad and the construction of the necessary terminal and harbor facilities on the Pacific Coast and the Gulf of Mexico. The contract which has just been ratified by the Mexican Government, includes all the work except the dredging and jetty construction, for deepening the harbors on both coasts. Negotiations with the Mexican Government are now being conducted by Messrs. Samuel Hermanos for the concession for this harbor work.

A Record for Air-Brake Hose.

Our attention has been called to a length of air-brake hose just taken off a passenger car of the Boston & Maine. The hose was put on in July, 1892, and has been in continuous service ever since. It is apparently in as good condition as ever except a slight chafe near the coupling. The hose was made by the Boston Belting Co. and is of its "Imperial" brand.

Iron Ore from Cuba.

The first cargo of iron ore from the mines of the Spanish-American Iron Co., located on the south side of Cuba, arrived at Philadelphia last week. This cargo is the first shipment out of about 50,000 tons of the ore, which have been sold to pig iron manufacturers in Eastern Pennsylvania. The Spanish-American Iron Co. five years ago acquired control of several thousand acres of iron ore deposits on the south side of Cuba, directly on the Caribbean Sea, and between Santiago and Guantanamo. A large amount of money was expended in exploring the property, opening mines and establishing facilities for handling the output. There is no harbor nearer than Santiago, and in order to ship ore economically it was necessary to construct an artificial harbor by building a great breakwater on the open coast. These preparations were completed several years ago, but no shipments were made until market conditions should be more advantageous. The reduction of the duty on iron ore from 75 cents to 40 cents per ton, and the increased demand for Bessemer iron ore in eastern Pennsylvania have started the shipments, and it is understood that the company will send a large amount of ore to Philadelphia during this year. The Spanish-American Iron Co. has its main office in New York. Two other companies, the Juragua Iron Co., which is owned jointly by the Pennsylvania Steel Co. and the Bethlehem Iron Co. and the Sigua Iron Co., also a Philadelphia company, organized about five years ago by capitalists identified with Norfolk & Western Railroad interests, make important shipments of iron ore to the United States.

Cuban Railroads.

Captain-General Campos, the head of the Spanish army in Cuba, announces that the Spanish government will contribute $20,000 per month for the construction of the railroad between Puerto Principe, the capital of the province of that name, and the port of Santa Cruz, on the eastern coast. Puerto Principe is already connected by rail with Nuevitas, on the western coast, and the construction of the proposed road would give the province a line railroad from the west coast to the east.

A Junket That Paid Expenses.

Under this title the Denver, (Col.) *Republican*, reporting the meeting of the State Board of Tax Equalization to fix railroad assessments, says:

"There was very little debate during the session. The handsome reduction given the Burlington for their 140 miles of track of $305 per mile, $32,700, was the result of the object lesson which several members of the Board got when they took their junket over it two weeks ago. To prove to the Board that business was dull, the company got a private car out here, loaded its pantries to gunwales and hauled the members over the road. Two freight trains were all the members of the party saw in the entire trip; $32,700 reduction in the levy."

Compounds of Argon.

The inertness of the new element, argon, has so far been its most striking characteristic. M. Berthelot, from recent experiments, has found that argon will combine, when mixed with benzine vapor and submitted to the silent electric discharge, in a way very similar to that in which nitrogen and hydrocarbons combine under the same treatment. The product is a yellow resinous matter, which condenses upon the surface of the tubes employed, and upon being heated, volatile products are given off, leaving a carbonaceous residue. These volatile products give an alkaline reaction with litmus paper. M. Berthelot's experiments tend to assimilate the new element much more closely with nitrogen, and it has been suggested that, were 42 instead of 40 taken as the molecular weight of argon, its weight would be one and one-half times that of nitrogen, and it would bear the same relation to this element that ozone does to oxygen. Therefore it is possible that argon may be simply an allotropic form of nitrogen. Much more can be learned concerning the new gas when it is produced in larger quantities.

Interloc-utions—No. 1.

"This is a queer world," said the Semaphore as he stretched his arms.

"Yes?" responded the Crank interrogatively, for although only a crank he was a pretty sensible one and he knew when the Semaphore began in that way, something more was pretty sure to follow.

"I don't know how it is," continued the Semaphore, "but things are worse than they ever were before. My lamp smoked all last night and my back wire was so loose yesterday that I could hardly get back to danger so I came pretty near letting the local go by with the work train standing around the curve right in front of them. I havn't had a coat of paint since just before the Directors took that junketing trip last fall, and there's a rotten spot just below my wheel that's getting bigger all the time. When that bog trotter who calls himself a repair man came along this morning he gave me a kick, called me a lousy old wreck and said he wished I'd fall down some night and ditch a train, then maybe they'd do some fixing up. I hope I may die if"—Just then the front wire straightened out with a jerk that made the red glass rattle in the spectacle and the Semaphore let his arm drop with a groan. The Crank laughed a little and as the Limited whizzed by muttered "my foundation is pretty shaky and one of my lag screws may be a little loose. but if the Gen. Man. don't worry I can't see why I should; I'd be a lot happier in the scrap heap any way with nothing to do but make rust."

For the Comfort of the Commuter.

The Belgian State Railways are constantly trying new experiments. A recent one consists in a medal, differing for different classes, which is issued to season ticket holders [commuters in the Yankee tongue], to be worn in the button-hole, so as to spare them the necessity of producing the actual season ticket itself except on rare occasions. The idea seems an excellent one for Belgium, though in London the multiplicity of different medals that such a system would necessitate would evidently overtax the capacity of the ordinary ticket collector. Of course, it would be too much to expect a Continental, and still more a Government railway, to rise to the height that we have reached in England, where season ticket holders are dealt with in masses without delay, by the simple process of taking it for granted that the ordinary traveler is not and does not desire to be a thief, and allowing the ticket collectors to be content nineteen times out of twenty with the mere word of the passenger that he is a season ticket holder, or even more frequently with a simple nod and failure to produce an ordinary ticket.—*Transport.*

A Texas Fete.

At the Union stockyards to-morrow 1,000 head of Texas steers will be loaded on cars preparatory to shipment to Northern markets. This will be a sight worth seeing, and the management of the stockyards company extends a cordial invitation to all visitors and home folks to visit the place. The loading will commence about 10:30 a. m., and ample accommodations are assured to all desiring to witness the exciting and novel occurrence. The Houston Heights and Glenwood cars pass within a block of the stockyards.—*Houston Post.*

The Use of Aluminum.

In 1884 150 lbs. of aluminum was used in the United States, at a cost of $9 per pound. This price continued for three years, and in 1886 3,000 lbs. was used. In 1887 the price fell suddenly to $3.27, and steadily decreased until it had reached 66 cents in 1891. This low price was maintained for two years by competition among the different manufacturers, due to an infringement suit. In 1893 the price rose to 75 cents, and 339,629 lbs. of the metal was used.

Liability Insurance.

The liability insurance companies held a conference in this city recently to consider various subjects affecting their welfare, and adjourned without accomplishing anything. The business of liability insurance on this side of the water has long been in a demoralized condition. The underwriters have rushed into new and untried fields, involving hazards of serious complixity, before gaining sufficient experience to formulate rates with even approximate accuracy, and it is safe to say that the majority of them are well aware that they are beyond their depth. One can insure against the claims of those who may fall through his hatchways, be injured by his elevators, have cases of goods fall upon them, be injured by wagons in the streets, or by the explosion of boilers, etc. The contract provides that unless the liability company settles with the claimant it must at its own cost defend in the assured's name all suits brought against him and pay such final verdict as may be rendered; but two such companies have failed within about two years; what are the now unindemnified defendants to do with the suits thus left to them to take care of. . . . For those who may buy liability insurance, now is none to early to lock the barn door. Some concerns will pull through, others may, and still others are unquestionably doomed.—*New York Journal of Commerce.*

European Electric Railroads.

Seventy electric railroads are now in operation in Europe, representing an increase, according to the *Industrie Electrique*, of 27 within the past year. Their total length amounts to about 700 kilometers, or nearly 435 miles, and their combined power equipment is 18,150 kilowatts, as compared with 10,650 kilowatts during the

previous year. The number of motor cars too has increased from 538 to 1,236. Of course, compared with American electric railroad statistics, these figures seem small enough and simply help to emphasize the important position which electric car propulsion has reached in the United States.

Within a year electric railroads have made their appearance in Bosnia, Portugal, Roumania, Servia and in Sweden. Among all European countries, Germany, in point of electric railroad mileage, stands at the head, with 366 kilometers, or about 227 miles, to her credit. Of this length the city of Hamburg alone has 180 kilometers, or nearly 112 miles. France comes second with nearly 100 kilometers, or 62 miles. At present, 28 new lines are in course of construction in the several countries, and are expected to be completed and ready for business before the end of the year.

Progress on the Philadelphia City Hall.

The greater part of the work of reconstruction and repair which has been made necessary by the settling of the tower of the Philadelphia City Hall, has been finished. Many large cracks in the tower itself and in the surrounding portions of the building were made by this settlement, which was due to the enormous load upon the tower and the poor quality of foundations. In the semi-cylindrical projection from the south face of the tower the ramping arches carrying the stairway and the stairway itself have been removed. The arched openings in the east and west sidewalls have been built in. Steel wedges were introduced between pairs of granite blocks inserted for the purpose, which wedges were driven in until the cracks in the walls above them were closed up. It is said that a plumb line 238 ft. long suspended in the center of the tower indicated that the axis of the tower had been deflected by the operation of the wedges so much as to cause the plumb bob to move $\frac{5}{16}$ in. This method of removing cracks has been used throughout the building. The spaces in the cracks between the wedges have been filled in with cement grout. As originally constructed many of the larger rooms were spanned by a single central girder from which floor beams or joists extended to the side walls. These girders having by sagging shown themselves to be insufficiently strong, a system of vertical trussing has been put in between the girders of the different floors. Each of these trusses consists of three panels. The side panels are each occupied by a diagonal strut. The central one is left open and is used as a doorway between the two compartments into which the room is thus divided. In some cases trusses were not used, heavy plate girders being substituted for the original I-beams.

The flooring is mostly of Carnegie corrugated plates covered with a concrete floor 3 in. thick.

The total weight of masonry in the tower above the concrete level, which is 28 ft. below the ground, is 62,768 tons. This portion is 337 ft. high by 70 ft. square outside and 45 ft. square inside. It is surmounted by an octagonal prism about 60 ft. high of wrought iron columns. The pyramidal portion of the tower, 115 ft. high, has recently been surmounted by the statue of William Penn, which is 36 ft. 6 in. high. The top of the statue is 548 ft. 1½ in. above the ground.

The architectural features of the upper combined prism and pyramid are made of cast iron about ¼ of an inch thick. The outer shell or cover is protected by copper plates weighing 14 oz. per sq. ft. A final plating of an alloy of alluminum and tin weighing 2½ oz. per sq. ft. is added for effect in color. Upon the tower there is a total of 186,000 lbs. of bronze work, including the Penn statue, which weighs 54,000 lbs. The highest point of the derrick or false work used in erecting the statue was 560 ft. above the ground. We glean these facts from the address of Mr. Trautwine, retiring President of the Engineers' Club of Philadelphia.

The Tramp.

The Massachusetts State Commission on the unemployed has recently submitted a special report on the professional tramp. The substance of this seems to be that the laws against vagrancy are not well enforced and that the police complain that there is not law enough. The Commission cannot suggest any specific for the removal of the evil other than a wide co-operation of police officers, judges and charitably disposed individuals. Indiscriminate giving, even of food, must be stopped and tramps sent to correctional institutions must be more rigorously treated; that is, they must be required to work. Riding on freight trains should be stopped by giving larger powers to state police and the appointment of special officers. Amendments to the law should embody the following principles: It should be easier to convict vagrants and tramps. Overseers of the poor should provide decent accommodations and food, but make the applicants work in return. Refusal to work should constitute evidence of tramping. Persons found riding on freight trains without authorized permission should be punished with the penalties against tramps.

The Narrow Gage in Germany.

Within the territory covered by the German Railroad Union at the close of 1893 there were 13 narrow-gage railroads, the gages varying from 30 in. to 3 ft. 8 in. The steepest grade was 132 ft. per mile; the sharpest curve 62 ft. radius. Their aggregate length was 429 miles, 51 miles of which were in public highways. Their average cost per mile was $29,073. Their rolling stock consisted of 157 locomotives, 400 passenger cars and 4,848 freight and baggage cars. The work done was 1,499,476 train miles, 23,831,000 passenger miles and 29,147,000 ton miles, equivalent to an average daily movement each way of 4.8 trains, 76 passengers and 93 tons of freight. Their average gross earnings were $2,055, and their net earnings $667 per mile. The total number of men employed was 1,176, whose average pay amounted to $246 per year.

Passes in Russia.

The Russian railroads have been keeping a record of the travel on free passes, by which it appears that for a period of five years about five per cent. of the passengers paid no fare. New regulations have been issued intended to restrict this travel, but very liberal privileges re still given to employees.

The British Ordnance Maps.

The great ordnance survey map of England, which has cost during the last 27 years about $1,000,000 a year, is nearly completed. It contains over 108,000 sheets and the scales vary from 5 to 10 ft. to the mile, for towns, up to $\frac{1}{16}$ of an inch to the mile. In this way hedges, fences, walls, buildings and even isolated trees are shown. Those portions of the map whose scale is 25 inches to the mile show in color even the material of which parts of a building are constructed. In the towns every porch, doorstep, lamp post and fire plug is shown.

Garbage Cremation in Philadelphia.

At present there are in use in the city of Philadelphia furnaces for the cremation of garbage whose total capacity is 800 tons daily. Some of these furnaces use petroleum forced into the furnaces by steam jets; with others coal is used, oil being added in order to improve combustion and avoid explosions.

Improvements of the Harbor at Philadelphia.

During the past year the dredging in improving the harbor at Philadelphia has aggregated 6,000,000 cu. yds. For this work from 13 to 16 dredges have been employed and the maximum monthly output was 800,000 cu. yds. A portion of this material was deposited upon Government property at League Island, and by this means an area of 125 acres was elevated 12 ft. above mean low tide. The entire work of the improvement of the port is about one-third finished. During the year ending June 30, 1894, $50,000 was spent in surveys, repairs, etc., of the dike at Bulkhead Bar and $24,000 in repairing dikes and dredging along the Schuylkill River. The depth of the channel over the bar at the mouth of the Schuylkill has been increased from 19 ft. 4 in., to 21 ft. 4 in. at mean low water.

The Sleeping-Car Business on the Continent of Europe.

The report of the operations of the Compagnie Internationale des Wagons-Lits, which is the Pullman Company of Europe, has recently appeared and shows an improvement over 1893, in spite of "hard times." The results of operation are summed up below in francs:

	1893. francs.	1894. francs.
Gross earnings	5 721,439	6,042,041
Working expenses	3,360.740	3,315,368
Net from operation	2,360,699	2,726,673
Fixed charges and sinking fund	1,797,312	2,078,054
Available surplus	558,302	646,439

This net result gives 4 per cent. on the capital against 3½ in the preceding year. The length of line over which the vehicles of the company are worked has been increased by 3,155 kilos., making it in 1894, 67,207. The number of vehicles was increased from 450 to 458. Among the new services established or to be established are dining cars between Moscow and Warsaw, a sleeping car service between Moscow and Sebastopol, a dining car service between Basle and Ventimiglia, besides sleeping car services in Spain and in Austro-Hungaria. The company is closely allied with the International Company of Great Hotels, which has within the last few years provided fine accommodations for its passengers. The principal hotels finished in 1894 were at Cairo and at Constantinople, in which cities three magnificent hotels have been built.

The Jungfrau Railroad Again.

Concerning the much talked of Jungfrau railroad in Switzerland, *Uhland's Verkehrs Zeitung* says: The total length of the proposed line will be about 7.6 miles, the maximum grade will be about 26 per cent., and the smallest radius of curvature, 197 ft. The gage will be 31½ in. This is the same as on the Mt. Pilatus and the Wengernalp roads. The cost will be about $1,600,000. It is assumed that 10,000 tourists will annually patronize the line as far as the station Eiger, some distance from the summit, and that 7,000 will go to the end of the line, and at 45 francs fare something like 5 per cent. can be paid on the investment.

The Delagoa Bay Railroad.

This railroad has just been completed, and is destined to exert an important influence on the commercial development of South Africa. It extends from the port of Lourenço Marques on the east coast of Africa, to Pretoria, the seat of the Transvaal Government, and is an extension of the short road built under the auspices of the Portuguese Government about 6 years ago. This line was carried inland about 60 miles. The extension of the line through the Transvaal is due to the foresight of Presidents Burgers and Kruger of the Transvaal. It affords the shortest route between the sea and the rapidly growing neighborhood of Johannesburg, and since it passes through a country rich in minerals and well adapted for farming it is a road of considerable value. The distance by rail from Cape Town to Johannesburg is 1,013 miles; from Delagoa Bay by the new road to Johannesburg the distance is 400 miles. The road is in two parts, one part lying upon high table lands which form the principal part of the Transvaal, the other on a low level section presenting many difficulties in construction work. Heavy excavations had to be made, and in places the line is constructed along the sides of precipices. Within a distance of six miles connecting the high and low level sections the country drops about 2,000 ft., and in many places on this section the gradients reach 1 in 18. For a distance of 2½ miles a mountain railroad with a single rack rail had to be adopted, limiting the speed to 5 miles. The locomotives are of German manufacture of a powerful type. The speed maintained covers the 350 miles between Pretoria and Delagoa Bay in 27 hours, which time it is expected to reduce to 18 hours. This new road will offer serious competition to the Cape government railroads, and its construction will probably affect largely the political and commercial development of the country.

LOCOMOTIVE BUILDING.

Two Baldwin locomotives have been ordered by the Brainerd & Northern Minnesota Railroad for logging purposes.

This year the Schenectady Locomotive Works has built, or contracted for, a total of 85 locomotives. This is undoubtedly a much better record than has been made by any other locomotive builder except the Baldwins. In comparison with the output in the corresponding period of 1894, when only eight engines were built, the increase is very remarkable.

The Schenectady Locomotive Works is building eight passenger locomotives for the "Big Four" road, six of which are to be duplicates of several now in service. The other two are of a later design with increased boiler capacity, larger grate area, lighter reciprocating parts and larger bearing surfaces. They will have 20 in. × 24 in. cylinders, 72 in. driving wheels, and be equipped with the Leach sand blast and all modern devices. The engine will have very near 2,200 ft. of heating surface and will not exceed a total weight of 125,000 lbs.

CAR BUILDING.

The firm of Farrell & Co., of Omaha, has this year ordered 16 tank cars from the Memphis Car & Foundry Co., of Memphis, and additional contracts for tank cars will be given out shortly. The firm expects to finally have 100 cars in operation in this service. The cars are run between Peoria and Omaha and New Orleans and Omaha, and it is proposed to run them through to New York and Philadelphia. They are mostly 60,000 lbs., some of them being of larger capacity, and they carry New Orleans molasses and glucose.

An order for 30 cars has been received at the Middletown Car Works. The cars are for a North Carolina railroad.

The Mount Vernon Car Manufacturing Co., whose works are at Mt. Vernon, Ill., has been running this year on the following orders, among other smaller contracts: Mexican Central, 230 box cars for the Mexican Central, 34 ft. long, of 60,000 lbs. capacity, equipped with air-brakes, Fox pressed steel trucks and Wagner doors. Since these cars were built, the Mexican Central has given an additional order for 100 box cars of similar capacity. For the South Carolina & Georgia, 250 fruit cars 34 ft. long, 60,000 lbs. capacity, with Westinghouse air-brakes, Trojan automatic couplers and Winslow roofs.

The contracts now in hand include the following orders: 75 furniture cars for the St. Louis, Alton & Terre Haute, 42 ft. long, 60,000 lbs. capacity, equipped with Westinghouse air-brakes, Tower automatic couplers made by the National Malleable Castings Co., Dunham doors, and Excelsior inside galvanized iron roof, manufactured by the Excelsior Car Roof Co., of St. Louis. Also for the same railroad, 50 box cars, 34 ft. long, 60,000 lbs. capacity, equipped with air-brakes and automatic couplers, Excelsior roofs and Dunham doors. For the Mobile & Ohio, 100 freight cars, 34 ft. long, of 40,000 lbs. capacity; 250 box cars for the Louisville & Nashville Railroad, 34 ft. long, 60,000 lbs. capacity, equipped with Westinghouse air-brakes, automatic couplers made by the Shickle, Harrison & Howard Iron Co., of St. Louis, being of cast steel; Wagner doors and Winslow roofs.

Also 400 double drop bottom gondola cars for the Louisville & Nashville Railroad, 34 ft. long, of 60,000 lbs. capacity. The cars are to be equipped with Shickle, Harrison & Howard Iron Co., cast steel automati ccouplers, but no air-brakes.

A list of some of the more interesting orders received by the St. Charles Car Co., so far this year, is given in the following statement:

Atlanta & West Point, 100 ventilated fruit cars and three coaches; Mississippi River & Bonne Terre, 100 dump cars; Texas Midland, 68 box, furniture, coal and tank cars and one caboose car; Paragould Southeastern, two box and one flat car; Venice Transportation Co., 10 60-ft. platform cars; Galveston, La Porte & Northern, 110 box, stock and coal cars, two cabooses and nine coaches; Kansas City, Pittsburgh & Gulf, two caboose cars; Hydraulic Press-Brick Co., 40 coal cars; Kansas City Refrigerator Car Co., 58 refrigerators cars, and A Pearson & Son, 200 platform cars.

Rhode, Curry & Co., of Amherst, N. S., have built the following cars so far this year, the last of the orders being just about completed:

From Dominion Atlantic Railway, four fish cars with passenger car trucks and eight box cars, fitted with air-brakes and automatic couplers; from Dominion Coal Co., Limited, 300 15-ton coal hopper cars, 425 two-ton mining cars, one first-class passenger car and one second-class passenger car; from Canada Eastern Railway, six flat cars and one first-class passenger car; from Windsor Gypsum Co., 10 plaster cars; from General Mining Association, Cape Breton, one snow plow. All the above orders, with the exception of the snow plow, have been completed this month.

The Cleveland, Cincinnati, Chicago & St. Louis has given orders for a considerable addition to its equipment this year, both passenger and freight cars, as well as motive power. It has contracted with the Terre Haute Car & Mfg. Co. for 100 60,000-lb. capacity platform cars. One half of these cars are to be delivered in June, the others in July. The cars are equipped with the Gould coupler, Westinghouse air-brake and National Hollow brakebeam. The company has also contracted with the Indiana Car & Foundry Co. for 200 platform cars of 60,000 lbs. capacity and 200 60,000-lb. stock cars, equipped with watering and feeding attachments. The stock cars are designed to handle stock to the seaboard and coal to the western territory on the return trip. The Pullman Company is building four 60-ft. postal cars, built in accordance with the latest Government revised specifications, so far as the framing is concerned, with "Big Four" standard six-wheel trucks, equipped with air-brakes on all wheels and lighted by Pintsch gas.

The Concord & Montreal expects to soon put in service six passenger cars now building, two being parlor cars ordered from the Barney & Smith Car Co., of Dayton, O., and four coaches from the Laconia Car Co.

The Barney & Smith Car Co. is working on a considerable number of orders, most of them being small contracts. The cars now being built include 500 hopper coal cars for the Pennsylvania lines. Detailed illustrations of this car are published in another column of this issue. Ten express cars for the Southern Railway and two parlor cars for the Concord & Montreal are being built. In street car work the company has been very busy and at present has contracts from railroads operating in Columbus, Toledo, Dayton, Cincinnati and Los Angeles, and a large number of cars have recently been delivered to Boston, Indianapolis and other cities.

The orders of the Pullman Car Co., received from railroad companies this year have included orders for freight equipment from the following railroads: Columbus, Hocking Valley & Toledo, 1,000 coal cars 35-ft. long equipped with Buckeye No. 4 car couplers; 525 box cars for the Southern Pacific 34-ft. 6¾in. long with California couplers; 200 ore cars for the Duluth, Missabe & Northern, 22 ft. long, with Chicago couplers; 1,000 coal cars for the Philadelphia & Reading and 300 ore cars for the Duluth & Iron Range.

The more important orders for passenger equipment have included contracts from the Southern Railway for 20 day coaches 64 ft. 4½ in. long and 4 mail cars each 68 ft. ½ in. long, both the coaches and the mail cars having Janney couplers; 9 vestibule day coaches for the Boston & Maine, 60 ft. long with Miller couplers; 4 mail cars for the Cleveland, Cincinnati, Chicago & St. Louis, 60 ft. 7 in. long, with Janney couplers; 18 day coaches for the Southern Pacific Co., and 6 coaches, 4 parlor cars and 2 baggage cars for the Boston & Albany. Smaller orders have included 3 coaches for the Indianapolis, Decatur & Western, 2 suburban cars for the Montpelier & Wells River Railroad, and a private car for the Sandusky, Mansfield & Newark, and passenger cars for the Chicago & Grand Trunk and the Portland & Rochester.

The more important orders for street cars are 50 open cars for the North Chicago Street Railroad; 40 closed motor cars for the St. Charles Street Railroad Co., of New Orleans, La., and 15 closed motor cars for the Milwaukee Street Railroad Co., of Milwaukee.

BRIDGE BUILDING.

Allenwood, Pa.—The County Commissioners of Union and Northumberland Counties will erect a bridge over the West Branch of the Susquehanna River from Dewart to Allenwood. The specifications will be prepared and bids are called for this month.

Booneville, Mo.—The Pencoyd Iron Works have been awarded a contract by the Missouri, Kansas & Texas for the completion of the seven-span iron and steel bridge across the Missouri River, at Booneville. The present structure is being replaced by a heavier one.

Canada & Michigan Tunnel & Bridge Company.—The bill to authorize the construction of a railroad bridge between Detroit and Windsor has received the assent of the Railway Committee of the House of Commons. The bridge must be commenced within five years, and finished within seven. It will be a cantilever, with a drawbride in the center, having a span of 1,000 ft. The drawbridge will be 45 ft. above the level of the river. It was originally the intention of the company to build a tunnel, but this idea has been abandoned.

Carlisle, Pa.—The County Commissioners have located the site for a new county bridge over Corrodoguinet Creek, at Wolf's Fording, Middlesex Township. It will be 200 ft. long. Bids for both frame and iron structures will be invited.

Casselman, Ont.—The bridge over the Nation River at this place is to be rebuilt at once. Mr. W. Shanley, C. E., is preparing the plans, and tenders will be called within a few days.

Hamilton, Ont.—Several representatives of engineering companies are making estimates on the cost of constructing the proposed tunnel for the Toronto, Hamilton & Buffalo Railway, with a view of tendering on the work. The line from Hamilton to Welland will be put under contract within a few days.

Johnstown, Pa.—Councils have authorized the City Engineer to prepare plans for a bridge crossing the Conemaugh River at the upper end of Maple avenue, connecting the Eleventh ward with Franklin borough.

McConnellsburg, Pa.—The County Commissioners have awarded the contract for the iron work of the bridge to span Aughwick Creek at Fort Littleton to Nelson & Buchanan, of Chambersburg, representing the King Iron Bridge Co., of Cleveland.

Montreal.—The Railway Committee of the Dominion Government has thrown out the bill of the South Shore Suburban Railway & Bridge Co., which was to authorize that company to build a new bridge across the St. Lawrence River from Montreal to Longueill. The scheme was opposed by the Montreal Harbor Board, the Board of Trade and various steamship lines at Montreal on the ground that it would interfere with navigation.

Norristown, Pa.—The Grand Jury now in session will probably recommend the advisability of bridging the lower portion of Airy street, from Green to Arch street, as well as from Aston to Barbadoes street.

Philadelphia.—The Board of Surveyors has approved the plans for the new Thirty-third street bridges at Fairmount Park, between Columbia and Girard avenues, which are to cross the Connecting and Philadelphia & Reading railroads. The two bridges completed will cost about $200,000. They will have stone foundations and abutments, and will be topped with plate girder iron. The bridge over the Connecting Railroad will be 25 ft. high, and that over the Reading road 50 ft. high. They will each be 60 ft. wide, having roadways of 40 ft. and sidewalks of 10 ft.

Union Bridge Co.—The announcement is made that the co-partnership heretofore doing business under the name of the Union Bridge Co., is dissolved; that is, Messrs. Maurice and Hayes have retired from the firm. The business will be carried on by a new co-partnership, under the old name, with Charles Macdonald and Andrew Onderdonk as partners. The good will of the business is transferred to the new firm and all existing engagements will be executed according to agreement.

Wayne, Pa.—The County Commissioners have engaged Engineer J. Elton Whiteside to make a survey for a new county bridge over Powell's Creek, at Sponsler's Mill.

Wellsboro, Pa.—The County Commissioners have let these contracts for iron work for bridges: Mansfield 76-ft., Groton Bridge Co., $1,400; Canoe Camp, 70-ft., Nelson & Buchannan, $1,400; Westfield, 90-ft., Nelson & Buchannan, $2,200; Nauvoo, 68-ft., Nelson & Buchannan, $1,350; Lawrence-Baldwin, 185-ft., Oswego Bridge Co., $4,950; Elk-Cedar Run, 71-ft., $1,400. The average price is about $22.64 a running foot.

Youngstown, O.—The Youngstown Bridge Co. has been awarded the contract for four spans of a double track bridge for the Lake Shore & Michigan Southern Railroad, to be constructed entirely of soft steel, and the company has also been awarded the contract for the structural work for an oil storehouse in New York.

RAILROAD LAW—NOTES OF DECISIONS.

Powers, Liabilities and Regulation of Railroads.

In the Federal Court it is held that, where a 10 per cent. reduction of wages by a receiver of a railroad is reasonable in itself under all the circumstances and the general condition of trade, it is not rendered unreasonable by the fact that his employees were already working on short time, with a proportionate reduction of wages; the shortening of time having been directed with their own consent, in order to avoid the discharge of many of their number.[1]

The Supreme Court of South Carolina holds that a railroad chartered by the State does not, by leasing its road, relieve itself from liability for personal injuries to a passenger, caused by the negligent operation of a train by the lessee.[2]

In Louisiana it is ruled that purchasers under foreclosures of mortgages of railroad franchises and property may organize a corporation under such name as they may adopt, which, by the organization, succeeds to such franchises and property, and takes the corporate capacity of the corporation against which the foreclosure proceedings were conducted.[3]

In New York it is held that where the sole condition in a conveyance of a right of way to a railroad is the establishment of an undercrossing on the grantor's land, no action lies for damages caused by the construction of a station and switch near such crossing, whereby the traffic at that point is largely increased.[4]

The Supreme Court of the United States holds that municipal bonds in aid of railroads, illegal at the time of issuance, may be legalized by the legislature.[5]

The Supreme Court of South Carolina rules that the statute making every railroad liable for the property of persons injured by fire from its locomotives, but allowing it to insure any such property, is not a taking of property from a railroad without due process of law or a denial of equal protection.[6]

The Federal Court holds that the Tennessee statute requiring trains on one railroad to stop before crossing the line of another has no application to the crossing by a steam railroad of an ordinary horse car line.[7]

In Illinois it is held by the Supreme Court that where all the property of a railroad owning a lease of part of another road is sold under foreclosure, and becomes the property of a new company, which takes possession of and uses all its property, the new road, as successor of of the other, is liable for the use and occupation of such leased line, even though there has been no formal assignment of the lease.[8]

In Missouri it is said that the constitutional provision which declares that railroads are highways and railroad corporations common carriers does not exempt land used by a railroad company for depot and yard purposes from a special tax for street improvements.[9]

Injuries to Passengers, Employees and Strangers.

The Federal Court holds that the Indiana statute which relieves railroads from liability, in certain cases, for injuries received by passengers when on the platform of a car, does not apply to passengers who, at the invitation of the brakeman, go on the platform for the purpose of alighting.[10]

In Texas it is laid down that the fact that a passenger goes to a wash room in a Pullman car for the purpose of washing his hands while the car is in motion, over an uneven road, does not per se render him guilty of contributory negligence in case he is injured while standing before the basin.[11]

In Maine it is held that one who uses a free pass for carriage, containing a condition that he will assume all risk of personal injury, is deemed to have accepted it on that condition, whether he reads it or not.[12]

The Supreme Court of California holds that a passenger is justified in taking passage on a crowded excursion train where defendant does not warn persons not to do so; and, even though such warning was given, he was not affected by it if he did not hear it.[13]

In New York it is ruled that where carrier agreed to furnish passage partly over its own line and partly over a connecting line, and to secure berths over the connecting line, it is liable for the failure of the connecting carrier to reserve berths, though a notice was printed on the ticket that defendant acted only as the agent, and was not responsible beyond its own line.[14]

In New York the Supreme Court rules that where a brakeman, in a yard in which some of the cars are defective attempts by daylight to couple one car to another at the end from which the extension block, bumpers and drawhead are all gone, and is crushed between the cars, he cannot recover damages therefor, since he either did not look to see if the car was defective, or, seeing the defect, which was obvious, did not attempt to avoid the danger.[15]

The Federal Court holds that under the Kansas statute making a railroad liable "for all damages done to any employee in consequence of any negligence of its agents, or by any mismanagement of its engineers or other employees," a railroad is liable to an employee who was injured by negligence of another employee while both were engaged in a roundhouse, in putting an engine in condition for use.[16]

In Tennessee it is said that the mere fact that a car inspector goes on one track in order to inspect cars passing by on another—such track being an appropriate place to inspect the cars from—does not render him guilty of contributory negligence so as to prevent a recovery in case he is injured through the negligence of an engineer running a switch engine on the track on which he is standing, though he knew a train was likely to pass along such track.[17]

In New York where a railroad employee is injured in consequence of his failure to signal a train to stop, as his instructions required him to do, he is guilty of contributory negligence.[18]

In California, A negligently went between defendant's railroad track and a high platform in front of moving flat cars. The track and platform were about three feet apart, and she stood in the space between them while one or more cars passed her, and was seen by the brakemen. A box car, wider than the flat cars, was then attached, and moved in the opposite direction until it struck A. The Supreme Court holds the railroad liable.[19]

In New York a railroad whose tracks cross those of another company by a low bridge is not required to maintain telltales to warn trainmen on the under road of the danger.[20]

[1] Thomas v. C. N. O. & T. P., 62 Fed. Rep. 17.
[2] Bouknight v. C. C. & A., 19 S. E., Rep. 915.
[3] V. S. & P. v. Elmore, 15 South, Rep. 701.
[4] Perry v. L. V., 30 N. Y. S. 140.
[5] Rogers v. City of Keokuk, 14 S. Ct. 1162.
[6] M. v. R. Co., 16 S. E., 429; Mobile Ins. Co. v. C. & G., 19 S. E. Rep., 858.
[7] Byrne v. K. City, Ft. S. & M., 61 Fed. Rep., 605.
[8] J., L. & St. L. v. L. & N., 37 N. E. Rep., 924.
[9] City of Nevada v. Eddy 27 S. W. Rep., 471.
[10] B. & O. v. Meyers, 62 Fed. Rep., 567.
[11] Sturdivant v. Ft. W. & D. C., 27 S. W. Rep., 170.
[12] Rogers v. Kennebec S. Co., 29 Atl. Rep., 1069.
[13] Lynn v. Sou. Pac. Co., 36 Pac. Rep., 1018.
[14] Bussman v. Western Trans. Co., 29 N. Y. S., 1066.
[15] Albert v. N. Y. C. & H. R., 29 N. Y. S., 1126.
[16] C., R. I. & P. v. Stahley 62 Fed. Rep., 363.
[17] Taylor v. L. & N. 27 S. W. Rep., 663.
[18] Le Bahn v. N. Y. Cent. & H. R., 30 N. Y. S, 7.
[19] Esrey v. South. Pac., 37 Pac. Rep., 500.
[20] Neff v. N. Y. Cent. & H. R., 30 N. Y. S., 323.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Boston & Albany, $2 per share, payable June 8.
Boston & Lowell, 3½ per cent., payable July 1.
Chicago, Burlington & Quincy, $1 per share, payable June 15.
Columbus, Hocking Valley & Toledo, 2½ per cent. on the preferred stock, payable July 1.
Delaware & Hudson Canal Company, quarterly, 1¾ per cent., payable at 21 Cortlandt street, June 15.
North Pennsylvania, quarterly, 2 per cent., payable May 25.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Canada Southern Bridge Company, annual, Detroit, Mich., June 16.
Chicago, St. Paul, Minneapolis & Omaha, annual, company's office in Hudson, Wis., June 8.
Missouri Pacific, special, at St. Louis, Wednesday, June 12. To act upon a proposed issue of bonds to replace the floating indebtedness.
Northern of New Jersey, annual, Englewood, N. J., June 19.
St. Louis, Iron Mountain & Southern, at St. Louis, Wednesday, June 12. The meeting is for the purpose of acting upon a proposed issue of bonds to replace the floating indebtedness.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *American Society of Mechanical Engineers* will hold its annual meeting at Detroit, Mich., June 25, 26, 27, 28.

The *National Association of Local Freight Agents* will meet in New York City at the Broadway Central Hotel on June 11.

The *Master Car Builders' Association* will hold its annual convention at Thousand Islands, Alexandria Bay, N. Y., commencing June 11.

The *Master Mechanics' Association* will hold its convention at the Thousand Islands, commencing June 17. Applications for rooms for both the M. C. B. and M. M. conventions should be made to J. B. Wistar and Charles W. Crossman, both at Thousand Islands, Alexandria Bay, N. Y.

The *International Railway Congress* will meet at the Imperial Institute, London, England, beginning June 26.

The *American Society of Civil Engineers* will hold its annual convention at Nantasket Beach, commencing June 18.

The *Western Railway Club* meets in Chicago on the third Tuesday of each month, at 2 p. m.

The *New York Railroad Club* meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, on the third Thursday in each month, at 8 p. m.

The *New England Railroad Club* meets at Wesleyan Hall, Bromfield street, Boston, Mass., on the second Wednesday of each month.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 2 p. m.

The *Southern and Southwestern Railway Club* meets at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

The *Northwestern Railroad Club* meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month, at 8 p. m.

The *Northwestern Track and Bridge Association* meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

The *American Society of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street New York, on the first and third Wednesdays in each month, at 8 p. m.

The *Western Society of Engineers* meets on the first Tuesday in each month, at 8 p. m. The headquarters of the society are at 1736-1739 Monadnock Block, Chicago. The business meetings are held on the first Wednesday at its rooms. The meetings for the reading and discussion of papers are held on the third Wednesday at the Armour Institute, Thirty-third street and Armour avenue.

The *Engineers' Club of Philadelphia* meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m.

The *Boston Society of Civil Engineers* meets at Wesleyan Hall, 36 Bromfield street, Boston, on the third Wednesday in each month, at 7.30 p. m.

The *Engineers' Club of St. Louis* meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The *Engineering Association of the South* meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville, Tenn.

The *Engineers' Society of Western Pennsylvania* meets in the Carnegie Library Building, Allegheny, Pa., on the third Tuesday in each month, at 7.30 p. m.

The *Technical Society of the Pacific Coast* meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The *Association of Engineers of Virginia* holds informal meetings on the third Wednesday of each month, from September to May, inclusive, at 710 Terry Building, Roanoke, at 8 p. m.

The *Denver Society of Civil Engineers* meets at 36 Jacobson Block, Denver, Col., on the second and fourth Tuesdays of each month except during July, August and December, when they are held on the second Tuesday only.

The *Montana Society of Civil Engineers* meets at Helena, Mont., on the third Saturday in each month, at 7.30 p. m.

The *Engineers' Club of Minneapolis* meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The *Canadian Society of Civil Engineers* meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday, at 8 p. m.

The *Civil Engineers' Club of Cleveland* meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The *Engineers' Club of Cincinnati* meets at the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati, O., on the third Thursday in each month, at 7.30 p. m. Address P. O. Box 333.

The *Engineers' and Architects' Club of Louisville* meets in the Norton Building, Fourth avenue and Jefferson street, on the second Thursday each month at 8 p. m.

The *Western Foundrymen's Association* meets in the Great Northern Hotel, Chicago, on the third Wednesday of each month. B. W. Gardner, Monadnock Block, Chicago, is secretary of the association.

The *Association of Civil Engineers of Cornell University* meets on Friday of each week at 2:30 p. m., from October to May, inclusive, at its association rooms in Lincoln Hall, Ithaca, N. Y.

Accounting Officers.

The American Association of Railway Accounting Officers held its annual meeting at Detroit, Mich., last week. Reports were made by committees on keeping accounts with express companies, on claims and on car accounts.

The following officers were elected for the ensuing year: President, G. W. Booth (B. & O.), Baltimore; Secretary, C. G. Phillips (C. & N. W.), Chicago. The next meeting will be neld at new York City.

Local Freight Agents' Association.

The National Association of Local Freight Agents will meet in New York City, beginning June 11. A large attendance is expected and business and pleasure has been planned to fill several days. The usual topics of interest to local freight agents will be brought up for discussion, but apparently not to the extent of wearying the participants. Among the subjects to be discussed are the following:

"Is filing a lien by railway companies for transportation charges, when delivery is made to United States

bonded warehouses, sufficient protection for the transportation companies charges?"

"The desirability of adopting a standard form for use in tracing freight."

"Who should be responsible for wrong delivery of a shipment received over one line and turned over to some other line on a telephone order for delivery at a suburban town?"

On the second day the members and their friends are to be taken around New York Harbor on a New York Central tug. On the third day they will go to Coney Island, and on Friday they will be the guests of the Pennsylvania Railroad at Asbury Park, N. J.

Engineers Club of Philadelphia.

The club met on May 18, with President Geo. S. Webster in the chair, and 72 members and visitors present.

Mr. Joseph Kemper read a description of a wreck of the railroad bridge at Connersville, Ind., and its temporary repair. The bridge crossed the White Water River in a southeasterly direction on the Cincinnati, Hamilton & Dayton Railroad, about half a mile below Connersville. It was of three spans, of 165 ft. each, and was composed of wood and iron combination through trusses, Warren pattern, with vertical posts and suspension rods. The width of the bridge was about 16 ft. and its depth about 30 ft.

About 2 o'clock on the morning of July 15, 1892, while an eastbound freight train was standing on the bridge, a runaway freight train came rushing down the one per cent. grade from Connersville, and crashed into the rear of the train on the bridge, resulting in the collapse of the two end spans of the three which composed the bridge. The middle span was left standing practically uninjured, with four freight cars on it.

Immediately upon receipt of the news of the wreck the work of repair was actively begun and was pushed so rapidly that in 24 hours traffic was resumed over the temporary bridge. Within five days the bridge had been repaired and traffic was resumed on the old line.

American Society of Civil Engineers.

The evening of June 5, 1895, was set down for the continuation of the discussion on the paper by William Ham. Hall, M. Am. Soc. C. E., entitled "The Santa Ana Canal of the Bear Valley Irrigation Company," read before the Society, Feb. 6, 1895, and published in the February number of the *Transactions*.

It was expected that discussion on the paper on "Painting Iron Structures Exposed to Weather," by E. Gerber, M. Am. Soc. C. E., would also be taken up.

The following papers will be presented and discussed at the convention:

"The Temperature of Lakes." By Desmond FitzGerald, M. Am. Soc. C. E.

"Notes on Manufacture and Properties of Malleable Cast Iron." By H. R. Standford, Assoc. M. Am. Soc. C. E.

"Topography on the Survey of the Mexico-United States Boundary." By J. L. Van Ornum, Assoc. M. Am. Soc. C. E.

"Construction of Substructure for Lonesome Valley Viaduct Knoxville, Cumberland Gap and Louisville Railroad." By Gustave R. Tuska, Jun. Am. Soc. C. E.

"Experiments on the Discharge of a 30-In. Stop Valve.' By J. Waldo Smith, Assoc. M. Am. Soc. C. E.

"Hollow Tile Floors, Past and Present." By Fr. von Emperger.

"The Life of an Iron Railroad Bridge." By J. E. Greiner, M. Am. Soc. C. E.

"The Separate Sewer System Without Automatic Flush Tanks." By F. S. Odell, M. Am. Soc. C. E.

"Consumption and Waste of Water." By Dexter Brackett, M. Am. Soc. C. E.

"A New Weir Formula." By Charles W. Sherman, Jun. Am. Soc. C. E.

George F. Swain, M. Am. Soc. C. E., will also give an informal address on the Boston Subway Work, and Frederic P. Stearns, M. Am. Soc. C. E., will give a brief description of the proposed Metropolitan Water Supply.

Boston Society of Civil Engineers

A regular meeting of the Boston Society of Civil Engineers was held May 15 at its rooms 36 Bromfield street, Boston, at 7:45 o'clock p. m., President Albert F Noyes in the chair. Seventy-eight members and visitors present.

Messrs. Arthur A. Fobes, Philip Marquand, Walter W. Patch and Hartley L. White were elected members of the society.

The Secretary reported for the Board of Government that it had voted to continue the Committee on Weights and Measures with the following membership: Charles T. Main, Allen Hazen and Dwight Porter. The board also recommended that the communications in relation to a standard of thicknesses for metals from the American Society of Mechanical Engineers and from the Engineers' Club, of St. Louis, be referred to the Committee on Weights and Measures for its consideration and that the committee be requested to report to the society what action it deemed advisable. On motion the recommendation of the board was adopted.

The Secretary read a letter from the Committee of the American Society of Mechanical Engineers on Standard Thicknesses for gages, transmitting a blue-print showing proposed decimal gage. The communication was referred to the Committee on Weights and Measures.

A letter was read from Mr. E. L. Corthell, a member of the society, inclosing a report of the Mexican Association of Engineers and Architects in relation to the formation of an international institute of engineers and architects. The letter and report were referred to the Board of Government.

Mr. J. Parker Snow then read a paper entitled "Wooden Bridge Construction on the Boston & Maine Railroad." The paper was discussed by Messrs. Cuppy and Rice. Mr. R. S. Hale followed with a paper entitled "Approximate Analysis of the Use of Coal in an Edison Electric Station of the Type Standard About 1890," which was discussed in a short paper by Mr. G. H. Barrus, read by the Secretary.

Master Car Builders' Association.

The first session of the convention will be called to order at 9 a. m., on Tuesday, June 11. Under the head of "Reports of Committees," the following business has been arranged:

1. Interchange of Cars.—To suggest how cars in interchange may be maintained equitably to owners and operators with least expense and detention. Committee: Pulaski Leeds, J. W. Marden, L. Packard, J. N. Barr, E. D. Nelson, Samuel Irvin, J. H. Rankin.

2. Road Tests of Brake Shoes.—To conduct and report upon a series of comparative tests of different brake shoes in service, with as complete data as possible. Committee: R. H. Soule, W. S. Morris, S. A. Crone, G. W. Rhodes, A. E. Mitchell, W. H. Lewis, J. W. Marden, A. M. Waitt, Jos. Townsend, Samuel Porcher, J. C. Barber, W. L. Hoffecker.

3. Laboratory Tests of Metal for Brake Shoes.—To conduct and report upon laboratory tests of different brake shoes, with as complete data as possible. Committee: S. P. Bush, D. L. Barnes, J. W. Cloud.

4. Lubrication of Cars.—Continued from 1894 to pursue its own recommendations as to tests of oil for lubrication, and to consider the economics of journal bearings as suggested in its report, if feasible. Committee: A. M. Waitt, W. H. Thomas, I. E. Wood, F. A. Stinard, W. K. Carr.

5. Air-brake Tests.—Committee: G. W. Rhodes, Geo. Gibbs, E. A. Williams, S. P. Bush, A. S. Vogt.

6. Air-brake and Hand-brake Apparatus on Cars.—Continued from 1894 to consider the questions raised in its report, and to include the standard levers and all other questions of importance pertaining to the subject. Committee: E. D. Bronner, Wm. McWood, Pulaski Leeds, W. P. Siddons, Jas. McGee.

7. Automatic Couplers.—To advise what changes may be desirable in the standard size of M. C. B. automatic coupler shanks, and to recommend a standard yoke or pocket strap for rear end attachment to cars. Committee: J. M. Wallis, A. E. Mitchell, J. T. Chamberlain, R. D. Wade, Wm. Garstang, T. G. Duncan, Thos. Kearsley.

8. Mounting New and Second-hand Wheels.—To report upon the best method for mounting new and second-hand wheels so that they shall be properly located upon the axle. Committee: J. N. Barr, G. L. Potter, J. H. McConnell, Wm. Forsyth, T. J. Hatswell, Thos. Sutherland, John Hodge.

9. Passenger Car Ends and Platforms.—To consider what improvements may be made in the construction of passenger car ends and platforms for increased strength in ordinary service and in emergencies. Committee: E W. Grieves, C. A. Schroyer, T. A. Bissell, F. D. Adams, M. M. Martin, J. J. Hennessey, Samuel Porcher.

10. Coal Car Sides.—To suggest best methods of construction and staying of the sides of 60,000 lbs. capacity coal cars with high sides. Committee: R. E. Marshall, R. P. C. Sanderson, R. C. Blackall, R. McKenna, Samuel Higgins, La Mott Ames, G. W. West.

PERSONAL.

—Mr. H. C. McFadden has been appointed Assistant General Passenger Agent of the Plant System, with office at Savannah.

—Mr. W. H. C. Brown has been appointed Assistant General Freight and Passenger Agent of the Kansas City Northwestern.

—Mr. Frank Janes, formerly connected with the Pennsylvania road at Toledo, has been appointed General Freight and Passenger Agent of the Findlay, Ft. Wayne & Western Railroad.

—Mr. George M. Gray, for over 20 years General Ticket Agent of the Pullman Palace Car Co., died at his residence, in Chicago, last Saturday, June 1, from the effects of a stroke of paralysis.

—Mr. W. S. Hoskins, Superintendent of the Gulf, Western Texas & Pacific and New York, Texas & Mexican railroads, which form the Victoria division of the Southern Pacific in Texas, has resigned his position.

—The announcement of the resignation of Mr. Cary A. Wilson as Chief Engineer of the Missouri, Kansas & Texas, published two weeks ago, was an error. Mr. Wilson is still acting as Chief Engineer of the company and does not intend to resign that position.

—Mr. Joseph Crawford, Superintendent of the New York Division of the Pennsylvania Railroad, is now on his way to a health resort in California with his family. Mr. Crawford has not been strong enough to attend to his duties for some weeks.

—Mr. A. P. Tanner, formerly Assistant General Freight Agent of the Atchison, Topeka & Santa Fe, has been appointed General Freight Agent of the Colorado Midland; Mr. F. B. Semple, formerly of the Union Pacific, Denver & Gulf is said to have been offered the position of General Passenger Agent.

—The report was current last week that Assistant Traffic Manager Emerson, of the Atlantic Coast Line, would resign his position in order to accept a similar position with the Seaboard Air Line. Mr. Emerson says, however, that he has no intention of severing his connection with the Atlantic Coast Line.

—Mr. E. E. Calvin assumed his new duties as General Superintendent of the International & Great Northern Railroad on June 1. He succeeds Mr. T. G. Golden, who has held that office for some years. Mr. Calvin comes from the Union Pacific, where he was Superintendent of the Idaho Division, with office at Pocatello, as announced last week.

—Sir Charles Rivers Wilson, the newly elected President of the Grand Trunk Railroad, has arranged to make a trip to America to examine the lines of the Grand Trunk Railroad with several other London directors. It is announced that Mr. Wilson will remain in America probably for some time to familiarize himself with the affairs of the Grand Trunk Railroad.

—Mr. David Edwards, who has been Secretary of the Michigan Passenger Association since 1893, has recently resigned that position, this action being required by long continued ill health. Mr. Edwards has been prominent in railroad work in Western states for over 30 years, and in that time has been connected with the Michigan Central, the Flint & Pere Marquette and the Detroit, Lansing & Northern, in important capacities.

—Mr. J. A. Briggs has been appointed Chief Engineer of Construction in the "annexed district" of New York City, that portion of the city lying north of the Harlem River, succeeding Mr. L. A. Risse, who has accepted the position of Chief Engineer of Congress, having in charge the construction of the new speedway along the Harlem River' which is one of the most important public works now projected in New York City. The salary of each position is $5,000 a year.

—Mr. Elliott T. Monett has been appointed General Western Passenger Agent of the New York, Ontario & Western Railroad, with headquarters at No. 33 North Clark street, Chicago. Mr. Monett commenced his railroad career with the Northern Pacific, and was with the West Shore in 1883. In 1887 he was appointed Eastern Passenger Agent of the Northwestern. In 1889 he took the same position with the Wabash, where he remained until 1893, when he assumed charge of the Chicago office of Peter McDonald & Co., a New York firm of immigrant agents.

—Capt. James Maglenn, who several months ago retired as Master Mechanic at the machine shops of the Seaboard Air Line, at Raleigh, N. C., and was succeeded for Mr. G. W. Eaves, formerly of Chicago, was last Friday reinstated in that position, Mr. Eaves having resigned. Captain Maglenn was Master Mechanic of the Seaboard Air Line shops at Laurinburg, N. C., for over 15 years, prior to their consolidation with the shops at Raleigh, a year or two ago at which time he was placed in charge of the consolidated shops, the position which he now again occupies.

—Mr. Charles H. Clough, Division Passenger Agent of the New York, Lake Erie & Western, with headquarters at New York City, died at his home in that city last week. He had been connected with the New York, Lake Erie Western since 1870. He was for some years Ticket Agent at important points in the West, and was Joint Ticket Agent at the Union station in Dayton, then was appointed General Baggage Agent of the New York, Lake Erie & Western, from which position he was promoted to be Division Passenger Agent.

—Mr. Samuel Schoch, President of the Positive Lock Washer Co., of Newark, N. J., died at Newark, N. J., last week. Early in life he entered the treasurer's office of the Morris & Essex at Hoboken. He was promoted until he became Superintendent, and retired when the road was leased by the Delaware, Lackawanna & Western and went to Texas, engaging there in railroading for some time, becoming finally General Manager of the Marquette, Houghton & Ontonagon, in Michigan. He was at Marquette for several years, and then ill health compelled him to resign, and he then made his home in Newark.

—Mr. C. F. B. Haskell, a civil engineer for some time past engaged in the Government Survey of the Columbia River in Washington, was drowned near Waterville, Wash., last week. Mr. Haskell had been engaged upon this Government survey for the past few years, but previously was with the Great Northern Railroad as Locating Engineer, and this position gave him the opportunity to do work of unusual importance and to discover a new pass through the Rocky Mountains which was finally adopted by the Great Northern Railroad in building its Pacific extension to the Pacific Coast. This is the Stevens Pass which lies much further to the south than any other pass before known suitable for a railroad. Mr. E. H. Beckler, then Chief Engineer of the Pacific Extension of the Great Northern, and his Chief Assistant, Mr. John F. Stevens, examined most of the known passes in the Cascade Mountains to decide upon a crossing for the Great Northern Railroad, in much of which work Mr. Haskell was employed. When Mr. Beckler and Mr. Stevens finally concluded that there existed a chance of a low pass south of the Cady Pass, which seemed the most favorable of the known passes, Mr. Haskell was selected to lead this search. The country south of Cady Pass was practically unknown and Mr. Haskell went up a branch of the Wenatchee River with instructions to explore the mountains at and near its source. He began this search with a single attendant, and went through an entirely uninhabited country which bore no signs of ever having been visited by any human being. In August, 1890, Mr. Haskell and his companion stood on the summit of the range, and looking to the south they located a gap where the heads of the two canons were divided by only a narrow ridge, and this on examination proved to be a practicable pass for a railroad and was named by Mr. Haskell Stevens Pass. This route was afterward visited by Mr. Beckler and Mr. Stevens, and the survey through the Cascades was begun in October, 1890. After the completion of the construction of this Pacific extension he resigned from the Great Northern Railroad and settled on the Wenatchee River, and, as stated above, for the past few years had been engaged in the survey of the Columbia River, under the auspices of the United States Government.

ELECTIONS AND APPOINTMENTS.

Atlantic & Danville.—N. M. Reid has been appointed Master Mechanic, vice W. A. Brown, with office at Portsmouth, Va.

Barre.—At the annual meeting of the stockholders of this company this week, the following directors were elected: A. D. Morse, E. L. Smith, John Trow and F. W. Stanyan, of Barre, Vt., and W. A. Stowell, of Montpelier, Vt. The following officers were elected: President, A. D. Morse; Vice-President and Managing Director, W. A. Stowell; Clerk and Treasurer, F. W. Stanyan.

Burlington, Cedar Rapids & Northern.—At the annual meeting of the stockholders, held at Cedar Rapids Ia., May 28, J. C. Peasley, W. G. Purdy, J. W. Blythe and W. H. Truesdale were elected Directors. The following officers were elected: President, C. J. Ives, Cedar Rapids; Vice-President, Robt. Williams, Cedar Rapids; Treasurer, H. H. Hollister, New York; Assistant Treasurer and Secretary, S. S. Dorwart, Cedar Rapids.

Chesapeake & Ohio.—T. C. Wells, Traveling Passenger Agent, with headquarters at Dallas, Tex., has been transferred to Cincinnati. Mr. Wells was formerly District Passenger Agent of the Baltimore & Ohio Southwestern in St. Louis.

Chicago, Paducah & Memphis.—The office of C. B. McCall, General Freight and Passenger Agent, has been removed from Mt. Vernon to St. Elmo, Ill.

Chickamauga & Durham.—H. T. Henderson is now Superintendent, vice J. I. Henderson, who died last February.

Cincinnati, Hamilton & Dayton.—George W. Haylor has been appointed Assistant Passenger Agent of this company, and also of the Louisville, New Albany & Chicago, with headquarters at Indianapolis, Ind. He is at present Chief Clerk of the Oregon Railway & Navigation Co., of Portland, Ore., and succeeds Mr. I. D. Baldwin in his new position. Before going to Oregon he was connected for a number of years with various railroads in Indiana & Ohio, was Chief Clerk to the General Passenger Agent of the Lake Erie & Western, and was also with the Cleveland, Cincinnati, Chicago & St. Louis.

Cleveland, Lorain & Wheeling.—W. A. Shoemaker has been elected Secretary and Treasurer of this company, with office at Cleveland, O.

Colorado Midland.—The following appointments are announced effective from June 1, 1895: George W. Ristine, Receiver and General Manager; Henry T. Rogers, General Solicitor; L. G. Cannon, Auditor and General Agent for Receiver; A. P. Tanner, General Freight Agent; W. F. Bailey, General Passenger and Ticket Agent, all at Denver, Col.; B. H. Bryant, General Superintendent, Colorado Springs; A. L. Humphrey, Superintendent Motive Power; and C. N. Davids, General Storekeeper, Colorado City.

Columbus, Sandusky & Hocking.—C. C. Collins has been appointed Assistant General Freight Agent and J. S. Beale Assistant General Passenger Agent, both with headquarters at Columbus, O.

East Barre & Chelsea.—At the annual meeting of the stockholders of this company, the following directors were elected: W. M. Carnes, F. L. Sargent, R. M. Minard and L. I. Cheney, of East Barre, Vt., and F. W. Stanyan, of Barre, Vt. The following officers were elected: President, W. M. Carnes; Vice-President, F. L. Sargent; Clerk and Treasurer, F. W. Stanyan.

Elkhart & Western.—At the annual meeting of the company, at Elkhart, Ind., May 24, the following officers were elected: H. E. Bucklen, President; J. R. Beardsley, Vice-President; E. A. Warfield, Vice-President; C. H. Winchester, Treasurer; Stafford Maxon, Secretary and Auditor; Directors, H. E. Bucklen, E. A. Warfield, J. R. Beardsley, C. H. Winchester, J. L. Broderick, W. J. Davis, H. C. Dodge, E. C. Bickel, S. Maxon.

Kansas City & Atlantic.—Arthur C. Paine has been elected Secretary, with office at Portland, Me.

Kansas City Northwestern.—H. C. Brown has been appointed Assistant General Freight and Passenger Agent of this company, with office at Kansas City, Kan.

Manistee & Northeastern.—W. J. Lau having resigned his position as Secretary and Treasurer, the duties of that office will hereafter be assumed by the General Manager, E. Buckley.

Memphis & Charleston.—R. L. McKellar has been appointed Assistant General Freight Agent, vice James S. Davant, resigned to accept other service.

Mobile & Ohio.—W. J. McLean has been appointed District Passenger Agent of this company, with headquarters at Chicago; W. H. Harrison, Jr., District Passenger Agent of this company, with headquarters at No. 220 Fourth Street, Des Moines, Ia.; M. H. Bohreer District Passenger Agent of this company, with headquarters at No. 168 Griswold Street, Detroit, Mich.

Monongahela River.—Hugh G. Bowles, previously General Superintendent, has been appointed General Manager, with office at Mononga, W. Va., as heretofore.

Pennsylvania Co.—The annual meeting was held in Pittsburgh, Pa., June 4. The old Board of Directors was re-elected, as follows: G. B. Roberts, James McCrea, J. T. Brooks, John E. Davidson, H. H. Houston, Frank Thomson, Henry D. Welsh, John P. Green, W. H. Barnes, Amos R. Little, N. P. Shortridge, Charles E. Pugh and George Wood. The Directors elected: George B. Roberts, of Philadelphia, President; James McCrea, James T. Brooks and John E. Davidson, Vice-Presidents; D. S. Gray, of Columbus, O., General Agent; S. P. Liggett, Secretary; and T. H. B. McKnight, Treasurer.

Pittsburgh, Youngstown & Ashtabula.—At the annual meeting of the stockholders of the railroad, held at Youngstown, O., May 16, the stockholders elected the following Directors: C. B. Wick, W. Scott Bonnell, J. G. Butler, Jr., Youngstown; Henry Morrison, T. E. Hoyt, Ashtabula; James McCrea, J. E. Davidson, Benjamin Shaw, J. D. Hancock, Pittsburgh; George B. Roberts, J. W. Hutchinson, Pittsburgh. The Directors elected J. W. Hutchinson President, S. B. Leggett Secretary, T. H. B. McKnight Treasurer.

Saginaw, Tuscola & Huron.—W. B. Rosevear has been appointed Freight and Passenger Agent, with office at Saginaw, E. S., Mich.

Seaboard Air Line.—The report has been current for a week or two that the Seaboard Air Line would remove the offices of the company, now at Atlanta, Ga., to Portsmouth, Va., where the office of Vice-President St. John has been located for sometime, and to which place the offices formerly located at Raleigh, N. C., were removed a year ago. A correspondent learns from an officer that the report is a correct one, and that the change will be made during June. The headquarters of the following officers will be changed from Atlanta to Portsmouth: General Manager, John H. Winder; General Superintendent, V. E. McBee; Superintendent of Roadway, T. W. Whisnant, and Engineer of Maintenance of Way, O. L. Cloud. All the principal officers of the Seaboard Air Line system will then be located at Portsmouth (where a building, costing $75,000, is just being completed for them) except President Hoffman, whose headquarters will remain at Baltimore.

Ulster & Delaware.—The title of Austin E. Benson, formerly Superintendent of Motive Power, is Assistant Superintendent instead of General Superintendent as noted in our issue of May 17, the latter position having been abolished for the present.

United Counties.—M. Wakefield has been appointed Mechanical Superintendent, with headquarters at St. Hyacinthe, vice F. Carr, M. C. B., resigned.

RAILROAD CONSTRUCTION,

Incorporations, Surveys, Etc.

Batavia & Northern.—The profiles of the route have been filed in the offices of the Clerks of Genesee and Orleans counties during the week. Engineers are working out details at the company's office at 45 Broadway, New York, in the preparation for the letting of contracts for the line north of Batavia, N. Y., and agents are in the field securing rights of way. It is expected that this work will be concluded in about two weeks. Much progress has been made in the development of the American & Canadian Navigation Co.'s plan for transportation of the railroad company's traffic from Oak Orchard Harbor, on Lake Ontario, to Canadian ports. Connections south from Batavia have been arranged for with the various railroad companies for northbound traffic.

Belton & Northeastern.—This company has been organized at Belton, Tex., with a capital stock of $500,000. The following directors have been elected: A. M. Montieth, H. C. Denny, P. Hammersmith, J. Z. Miller, Jr., Lee Peyton, Geo. C. Pendleton, W. S. Holman, George W. Tyler, J. L. Wilson, N. K. Smith, T. A. Cochran, J. C. Miller, Sr., Henry Austin, Silas Baggett, B. A. Ludlow, McB. Smith, S. M. Ray. A charter will be applied for at once and engineers placed in the field to make preliminary surveys from Belton for a connection with the St. Louis Southwestern.

Canadian Roads.—Andrew Allan, Hugh A. Allan, Andrew A. Allan, James B. Allan and A. A. McKenzie, of Montreal, Que., and Bryce T. Allan, of Boston, are applying for power to incorporate the Langenburg & Southern Railway Company, to connect Langenburg, in Assiniboia, with the Canadian Pacific line between Red Jacket and Elkhorn.

Central New York & Western.—The narrow gage division of this railroad, which extends from Bolivar to Olean, N. Y., near the Pennsylvania State line, a distance about 20 miles, is to be made a standard gage railroad. This is the most southern division of the company's lines and is at present not connected with the other divisions operated by the company. It is intended to build a connecting line from Bolivar to Angelica, N. Y., in order to complete the connection with the divisions to Wayland and Hornellsville.

Everett, Port Angeles & Pacific.—Col. J. L. Coolican, President of the Port Angeles Board of Trade, has returned to Washington from the East, where he went to interest capital in this proposed road. He announces that he has been successful and has arranged for the financing of the road, so that actual construction will be begun within a month. The line as contemplated is to extend from Port Angeles down the west side of Puget Sound to a point opposite Everett, probably Port Ludlow. It is also contemplated to run a ferry between Port Angeles and Victoria.

Georgetown & Granger.—Tracklaying on the railroad has proceeded three miles from Granger, Tex., where the work has been temporarily suspended, waiting further instructions from President Emzy Taylor, who is now in New York. The work on bridges is still going forward.

Hutchinson, Oklahoma & Gulf.—Chief Engineer Jackson, of Guthrie, is locating the line from its present terminus on the Southern Kansas line to Denison, Tex., and it is claimed that work will begin about July 1.

Kansas City, Pittsburgh & Gulf.—Chief Engineer Nelson states that the grading is going on south of Siloam Springs, Ark., and the line is located as far as a point 40 miles north of the Arkansas River. Mr. Nelson will put engineers in the field at Sallisaw at once to locate to the river.

Long Island.—The South Shore extension of this company's lines, which is built under the name of the Montauk Extension Railroad, was last week completed into Amagansett, which is as far as the extension will be carried this year. The extension is about eight miles long along the South Shore line of Long Island from Bridgehampton, the new line branching off and taking a more southerly route than the old line beyond that town which runs to Sag Harbor. The construction of this branch has some connection with the long discussed plan of Austin Corbin for the development of the land at the extreme end of Long Island, 20 miles beyond Amagansett. Mr. Corbin's plans include the building of a town at this point, which would be made a port of entry, and which he thinks would become the American terminal point for many European steamers.

Mexican Central.—The reports of a probable revival of the idea of a Pacific extension, which have recently come from Mexico, are denied by the company's offices in Boston. The original concession for this line from the Mexican Government, provided that the road should be completed to the Pacific Coast in eight years. The Guadalajara Branch, which is the first section, was completed in 1888, and the time for completing the line to the Pacific was extended to July 1, 1897, for the second, and to July 1, 1898, for the third section. Under the agreement the company had to present plans for the second section by July 1, 1894, and for the third section by July 1, 1896, and it also was required to designate before July 1, 1895, the port on the Pacific at which the road would terminate. The directors decided it inadvisable to attempt to carry out the contract, and in March, 1894, the Government released the company from the obligation. With the cancellation of the concession $400,000 Mexican Government bonds, deposited by the company as a guarantee for the completion of the line were returned, and the company redeposited them in exchange for $375,000 of its consolidated mortgage bonds which had been on deposit as a guarantee for the completion of various permanent works under various concessions. The consolidated mortgage bonds returned to the treasury of the company. Thus the matter of the Pacific extension was closed.

Milwaukee & Waukesha.—Articles incorporating the company with a capital stock of $1,000,000 have been filed at Madison. The incorporators are the directors of the company, Max Rosenthal, James Petley, A. B. Myeres, Stutley I. Henderson, Jacob Wellauer and Joel W. Bingham, of Milwaukee and John J. Constantine, Charles Pettelkow and Andrew Snyder, of Waukesha, Wis.

New Roads.—The Board of Supervisors of Santa Barbara, Cal., have granted a franchise for a railroad in the upper portion of the county, the route to be from Foxen Canyon to the ocean, by way of Santa Maria. William T. Lucas, William L. Adam and J. T. Goodwin are the projectors. The line will connect the rich valleys of Sisquoc, Tepusquet, East Santa Maria and Santa Maria with the new Coast road of the Southern Pacific.

New York, New Haven & Hartford.—The Connecticut Legislature, has recently passed a bill giving the holders of the debenture bonds of this company equal privileges with the holders of the stock of subscription to new bonds or stock which may be issued.

Olean, Osway & Eastern.—The 27-mile extension from Genesee, Pa., to Canisteo, via West Union and Greenwood, connecting with the Erie road near the Erie station, seems to be a fixed fact. President J. B. Rumsey stated that if the Canistoe business men subscribed $25,000 stock, work will be commenced at once, and the road completed within a year. Over $15,000 has now been subscribed.

Oregon Railway & Navigation Co.—The preliminary survey of a new branch line has just been completed in Klickitat County, Wash. The proposed line is about 30 miles in length, from Lyle, about 12 miles below the Dalles to Goldendale, the county seat. As the Oregon Railway & Navigation Co. is in the hands of a Receiver, the chances of the immediate construction of this line are not very promising.

Ottawa, Arnprior & Parry Sound.—The third ten miles of the Parry Sound Railway from Loup Lake, Ont., west, will be put under contract at an early date.

Pennsylvania Midland.—Contractor J. W. Rutherford is making preparations to resume work on this line in Bedford and Somerset counties, Pa. U. S. Houck is in charge of the engineering party which began operations May 28, near Osterburg. Three new engines were received last week for use on the road.

Pittsburgh & Eastern.—The contract for the construction of the first division of this railroad has been awarded to P. McManus, of Philadelphia. The division, which is 18 miles long, extends from Mehaffey, Clearfield County, to Rankin Summit, Pa., and work will begin at once. The division is to be ready for operation by Oct. 1. It will develop the Cush Creek and Glen Campbell coal districts in Western Pennsylvania and open up large timber lands near Burnside, Clearfield County. The second division of the road will be 45 miles long and extend to Saltsburg, Indiana County. The contract for its construction will probably be given out later in the season. S. H. Hicks, of Philadelphia, is Vice-President and General Manager.

Port Huron & Lexington.—It is announced that work north of Port Huron, Mich., will be commenced this week on this road. The contract has been let to Fick Bros., of Detroit, and the road is to be completed within 90 days. The survey of the new road has already been made. E. H. Brennan is President and Chief Engineer.

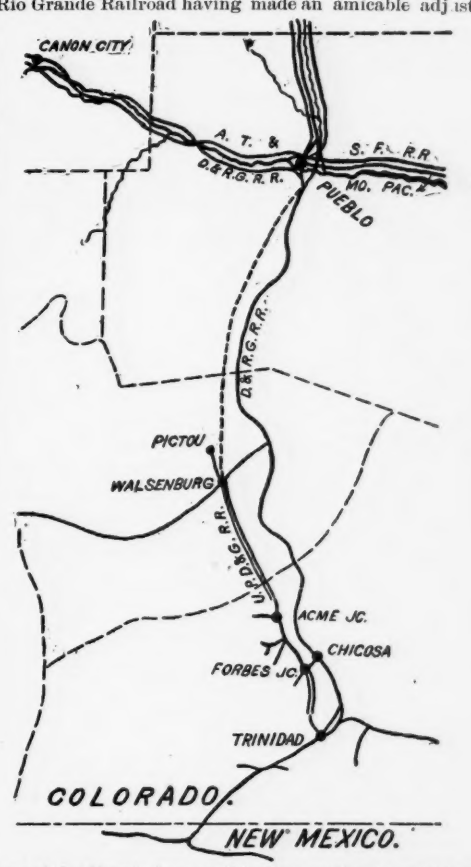
Pueblo & Silver Cliff.—This railroad company has been organized in Denver for the purpose of building a railroad from Pueblo to Silver Cliff, Col. The road is projected through large coal fields which can not at present be reached by any railroad and large lead ore mines in Custer County, Col., which are also unavailable at present.

Rio Grande Northern.—The construction work on this railroad has now reached a point about eight miles beyond Chispa, a station on the Southern Pacific Railroad in Jeff Davis County, just east of the El Paso County Line. This town is to be the southern terminus of the railroad which is projected to reach the San Carlos coal mines north of the Rio Grande River and about 29 miles from the connection with the Southern Pacific. It is expected that the line will be ready for operation by October next. The grading now being done is by G. Keil, of San Antonio, Tex. The route to the mines is through an unsettled country, and the work of construction has been quite difficult. One tunnel has been built in trap rock, and the maximum grades on this division are 2½ per cent., and the maximum curvature is 10 deg. There are also four steel bridges to build and many trestle structures. The work is being done in a substantial manner, and the rails are 62½-lb. sections rolled by the Illinois Steel Co. The tracklaying is now going on and is in charge of G. L. Marshall, Chief Engineer, and James N. Hamilton, Engineer of Construction. The funds for the railroad were furnished by Pittsburgh people who are interested in the development of the coal mines.

Rochester & Southern.—The New York State Railroad Commissioners have granted a certificate to construct its road. It is practically an extension of the Lehigh Valley and is to extend from Hemlock Lake to Honeoye Falls, near Rochester, a distance of 13 miles.

St. Louis, Avoyelles & Southwestern.—F. M. Welch, of Bunkie, La., the President, and W. J. Hilands, of Cleveland, O., the Vice-President, have recently been over the road now being constructed from Bunkie, La., to Simmsport, and a branch road from Marksville and Red River. They state that 28 miles of the road is now graded, the cross ties are laid, and the roadbed is ready for the rails. The company has placed the order for 3,600 tons of 56-lb. rails, and has also contracted for some of its equipment. The company expects to have 36 miles of the road in operation by July 15. The right of way as far as Baton Rouge has been secured.

Union Pacific, Denver & Gulf.—The threatened parallel road to give this company a line of its own between Trinidad and Pueblo, Col., will not be built, the receiver of this company and the officers of the Denver & Rio Grande Railroad having made an amicable adjustment of the dispute in regard to the rental to be paid for the continued use of the Denver & Rio Grande tracks between these points. Under this agreement the Union Pacific, Denver & Gulf abandons its plan for the construction of an independent line into Pueblo, but is to complete the 20 miles of railroad now under contract north of Trinidad to Walsenburgh, Col. The trackage contract with the Denver & Rio Grande Railroad was made in 1887 with the Denver, Texas & Fort Worth and the Denver, Texas & Gulf railroads. In the last few years this trackage rental has been $185,000 a year, but the Receiver, Frank Trumbull, considered this rental excessive, and on applying to the court secured authority from Judge Hallett, of the United States Circuit Court at Denver, to build a parallel line of railroad from Trinidad into Pueblo unless the Denver & Rio Grande Railroad agreed to accept the sum of $100,000 a year as rental for



its tracks between those points, and $300,000 of receiver's certificates were authorized to be issued to begin the construction of this new line. The officers of the Denver & Rio Grande declined to accept as sufficient the rental offered by the court and in February of this year the receiver let a contract for constructing 7½ miles of railroad from a point just north of Trinidad to Forbes Junction. This was to connect with several mining branches, these branches aggregating altogether 12½ miles, constructed previous to 1893. The map which is published herewith will show the route of the Union Pacific, Denver & Gulf proposed new line between Trinidad and Pueblo. The short section north of Trinidad is represented by a double line, and the second piece of railroad placed under contract—that is, from Acme Junction north to Walsenburgh—is also represented by a double line. This last section is 20 miles long and is now being graded by Andrew Sheridan. The line north of Walsenburgh into Pueblo was surveyed during the winter of 1894 and 1895 by Mr. F. A. Bissell, Chief Engineer of the company, and the final location was under way when the agreement was reached between Receiver Trumbull and the officers of the Denver & Rio Grande Railroad, settling the whole question satisfactorily to both interests and making unnecessary the construction of the additional railroad. As is stated above, the two sections now under contract, the line from Trinidad to Forbes Junction, 7½ miles, and from Acme Junction to Walsenburgh, which is being graded, will be completed by the Union Pacific, Denver & Gulf. The rails for these sections are now being rolled by the Colorado Fueland Iron Co., of Pueblo. The rail is a 65-lb. section, being the standard of the American Society of Civil Engineers' Committee for that weight.

San Francisco and San Joaquin Valley.—Chief Engineer Storey states that the line between Stockton and the Stanislaus River is practically surveyed, with the exception of a distance of a few miles near Stockton. This week two surveying parties were sent further south to commence work.

South Alabama & Gulf.—The survey of the proposed railroad from Dothan to Greenville, Ala., has already been commenced from Dothan. It runs west from Dothan via Wicksburg, and crosses the Choctawhatchee, three miles below Clayhatchee, and will extend between Central City and Keyton, in Coffee County, thence to Elba and Greenville.

Toronto, Hamilton & Buffalo.—The new division of the road from Hamilton to Waterford, Ont., 38 miles, is now in operation and train service established. This is a western extension of the line which has been built for some years between Brantford and Waterford, 18 miles.

Winnipeg & Great Northern.—Messrs. Grant & Foley, contractors for the Winnipeg & Great Northern, are having plans and profiles of the road prepared preparatory to letting the contract for the grading. It is expected that the work will be commenced in June.

GENERAL RAILROAD NEWS.

Allegheny Valley.—Speyer & Co., bankers, of New York, this week invited subscriptions for $5,000,000 of this company's 4 per cent. general mortgage gold bonds at 104 and accrued interest, guaranteed by the Pennsylvania Railroad. Of the bonds now offered, $4,000,000 are issued for the purpose of retiring a like amount of 7.3 per cent. bonds maturing March 1, 1896.

Atchison, Topeka & Santa Fe.—The Joint Executive Reorganization Committee of the company has declared the reorganization plan effective. The committee has received $67,000,000 of the general mortgage four per cent. bonds, or $2,000,000 above a majority necessary to make the plan operative.

The earnings for April are given in the following statement:

	1895.	1894.	Inc. or dec.	
Atchison proper.—Month April:				
Gross earn	$2,393,776	$2,356,962	D.	$36,813
Net earn	439,951	390,769	I.	19,182
For 10 months:				
Gross earn	$24,366,538	$27,086,858	D.	$2,718,289
Net earn	5,879,074	8,165,920	D.	2,286,846
Colorado Midland.—Month April:				
Gross earn	$154,183	$113,642	I.	$40,511
Net earn	49,654	Def. 10 183	I.	59,838
Ten Months:				
Gross earn	$1,305,321	$1 235,688	I.	$69 633
Net earn	254,375	141,331	I.	123,043
St. Louis & San Francisco.—Month April:				
Gross earn	$487,732	$730,214	I.	$37,517
Net earn	185,303	133,754	I.	51,548
For 10 months:				
Gross earn	$5,156 681	$5,270 206	D.	$113,625
Net earn	2,195,710	1,985,712	I.	210,027
Atchison system.—Month April:				
Gross earn	$3 311.248	$3,272,923	I.	$38,325
Net earn	678,752	561,627	I.	117,124
For 10 months:				
Gross earn	$33,597,302	$36,182,406	D.	$2,585,104
Net earn	8 711.749	10,392,285	D.	1,681,1o

Atlanta & Florida.—This railroad, extending from Atlanta to Fort Valley, Ga., a distance of 104 miles, was sold at Atlanta, on June 4, and was bid in by the Central Trust Co., of New York, for $275,000. The upset price had been previously fixed by the Court at $175,000, but by consent of the bondholders and the Central Trust Co. the upset price was fixed by Judge Newman the day before the sale at $275,000.

Cape Fear & Yadkin.—Request has been made by the reorganization committee to the Farmers' Loan & Trust Co. of New York, trustee of the mortgage, to postpone application for a foreclosure decree. It had been expected that such an order would be obtained on June 12. The reorganization committee desires that such action may be postponed until the plan of reorganization, now being formulated, can be completed and approved by the bondholders.

Central of New Jersey.—The operations of the railroad for April and the four months make a favorable comparison with last year:

April:	1895.	1894.	Inc. or Dec.	
Gross earn	$1,019,401	$912,383	I.	$107,018
Oper. exp	617,461	646,489	D.	29,028
Net earn	$401,940	$265,894	I.	$136,046
Since Jan. 1:				
Gross earn	$3,704,416	$3,463,415	I.	$238,001
Oper. exp	2,42?,832	2,521,753	D.	92,921
Net earn	$1,275,584	$941,662	I.	$330,922

Frankfort & Southeastern.—This railroad, 25 miles in length, from Frankfort to Thompsonville, was sold at Benzonia, Mich., last week under a decree of the United States Court. It was bid in by Congressman William Alden Smith, of Grand Rapids, in the name of George Lord Day, of New York, and Albert C. Hall, of Connecticut, at $100,000. The road forms a part of the Toledo, Ann Arbor & North Michigan line, but the purchasers have organized a new company called the Escanaba, Frankfort & Northeastern, which will hereafter control it.

Mexican National.—This company has made an arrangement with the Government of Mexico for conversion of the remaining $3,335,685 of the company's subsidy. The subsidy certificates, which should have been redeemed from import duties up to August, 1893, are to be at once converted at par. The balance is to be discounted at the rate of 7½ per cent. per month, on the basis of a monthly yield of $80,000 from import duties. For the entire amount thus found to be due the bondholders of the company are to receive 5 per cent. interior redeemable debt bonds at 72.

Mobile & Ohio.—An agreement has just been completed by the company providing for the sale of $1,250,000 of its four per cent. general mortgage bonds now held in the treasury. This sale will relieve the company of all floating debt. The bonds will be offered to the company's stockholders at 65 per cent., and the sale has been underwritten at the same figure by a syndicate which will act absolutely without commission. The floating debt was created largely in purchasing new equipment in 1894, when the company was enabled to secure specially advantageous terms.

New York, Lake Erie & Western.—The June coupon on $4,031,400 funded coupon 5 per cent. bonds of 1885 of the company was due June 1, and default was made in its payment in accordance with a proposed new scheme of reorganization. About $3,200,000 of these bonds were deposited under the old plan to be exchanged at par for new general mortgage fives. In a circular issued on Dec. 10 last Messrs. J. P. Morgan & Co. asked the bondholders who had deposited under their plan to consent to the issue of the new general mortgage bonds with the coupons of June and December, 1894, to be paid as soon as practicable out of the net earnings. This circular also stipulated that an assent to its terms should also give the firm authority to take whatever action might be deemed best if the interest due June 1 on the new general mortgage bonds could not be paid. It is not stated what action Drexel, Morgan & Co. will take.

The latest reported earnings of the Erie Company are for the six months ending March 31 of the current fiscal year, and show a decrease of $348,692 in net as compared with the same period of the previous fiscal year. In that year the company failed to meet the interest on its funded debt, fixed rentals, and other charges by $1,167,497. The floating debt, including $2,315,777 interest on funded debt unpaid, was at the end of the last fiscal year about $14,000,000.

Northern Pacific.—There are no new developments in the suggested plan for the joint operation of this road and the Great Northern. During the week Edward D. Adams, of the Northern Pacific reorganization committee, which is understood to have made the suggestion for the operation of the Northern Pacific by the Great Northern, returned from Europe, but declined to talk about Northern Pacific affairs. He admitted that he had a conference in London with J. Pierpont Morgan and representatives of the Deutsche Bank and the Great Northern interests. After that he went over to Berlin and conferred with four separate Northern Pacific committees. He said he had returned with full authority to continue his work in the preparation of a plan for the reorganization of the Northern Pacific Railroad Company.

TRAFFIC.

Traffic Notes

The Railroad Commissioners of California have refused an application from the Southern Pacific for leave to raise freight rates on petroleum L. C. L. from third class to first class.

The Atchison, Topeka & Santa Fe announces that the passenger train leaving Galveston, Tex., for St. Louis in the evening will hereafter run through in about 11½ hours less time than hitherto.

The Railroad Commissioners of Georgia have granted a petition, recently presented by local freight agents in Atlanta, for leave to close their freight houses on Saturday afternoon during the summer at 3 o'clock.

On the occasion of a recent monument dedication at Raleigh, N. C., the Southern Railway and the Seaboard Air Line carried over 30,000 passengers to that city within a day and a half, fares having been reduced to about one cent a mile from points within 100 miles.

The Pennsylvania Railroad now runs trains between Philadelphia and Cape May, 81 miles, in one hour and 45 minutes. The South Jersey Railroad, in connection with the Philadelphia & Reading, makes the same time. The Reading now runs trains between Philadelphia and Atlantic City in one hour and five minutes.

Mr. Moore, General Freight Agent of the Northern Pacific, has issued to agents along his line a circular headed "PIGS!" in which he reminds farmers who have a surplus of potatoes—of whom it is said there are a good many—that the raising of swine is the best way to avoid loss by the waste of potatoes. Mr. Moore proposes to induce live-stock dealers to go out and give orders in advance for pigs if the farmers desire it.

The Panama Railroad, having been enjoined by a New York court not to discriminate against the Pacific mail steamers, has announced a discontinuance of all through billing with steamers, both ways; but it is stated that four new steamships have been put on to run between Panama and Central American ports, on the west side which will be managed in sympathy with the railroad.

Suits have been brought at Harrisburg, Pa., by seven prominent iron mills, against the Pennsylvania Railroad for alleged overcharges on coal. It is claimed that for five years the rates were unduly favorable to certain Philadelphia parties, and the total amount of overcharges claimed is $350,000.

The Pennsylvania Railroad has introduced on some of its branches near Philadelphia new forms of 100-ride, tickets good for 12 months, which supersede the monthly and quarterly tickets heretofore used. The company announced that the new form would be introduced, June 1, on all of the lines leading to Philadelphia, but the season ticket passengers made such a strong remonstrance that the order was suspended. It appears that the proposed new tickets are similar to those used by the Boston & Albany, to and from Boston; the rates are higher than for ordinary season tickets, but the thickets are made sufficiently transferable to allow the holder an advantage to compensate for the increase in rate.

A man in Iowa, Mr. Galton, sued the Chicago, Rock Island & Pacific for $10,000 overcharges on live stock sent over that road some eight years ago, the claim being made that other shippers paid $17 less per car than the rates charged complainant; but the State Court has just decided in favor of the railroad company. The shipments were made before the Interstate Commerce law took effect; they were interstate, and the discrimination would not be illegal except under the common law; and the common law has no place in national jurisprudence.

Chicago Traffic Matters.

CHICAGO, June 5, 1895.

Eastbound shipments last week show a large falling off from the preceding week, and a still greater decrease over the corresponding week last year. The decrease is largely in grain, and is attributable to the fluctuating market here. The same is true of lake shipments, only 30,000 bushels of wheat being forwarded by boat from this port. Notwithstanding the light shipment of grain by lake rates generally are reported as firm, chiefly owing to the very heavy movement of iron ore.

Eastbound rail rates are apparently being maintained from here, but there continues to be more or less demoralization from St. Louis. Rates in the territory of the Western Trunk Line Committee are in a precarious condition, and the same is true of all Texas rates.

Heavy rains last week in the corn belt have brightened the crop prospects considerably, but it is yet too early to prognosticate with any degree of certainty as to the outcome.

Interest in western traffic affairs last week centered in the meeting of executive officers of western lines held here for the purpose of patching up the agreement of the western trunk line committee. Ever since the Missouri Pacific and the Wabash declined to be bound by the agreement (to accept the percentages allotted them), the affairs of the association have been drifting from bad to worse. The Burlington has been running ahead of its allotted percentages and the same is true of the Missouri Pacific. This fact is seized upon by both lines as a reason why their demand for increased percentages should be allowed. The other lines claim that the reason these roads have been running ahead is that they have been emulating the "heathen Chinee" in "tricks," which in this case seem not to have been "vain." To complicate the situation, the Missouri Pacific recently gave notice of the withdrawal of its Iron Mountain line from the agreement. This at once precipitated a general rumpus. After spending three days in a meeting, the best that could be done was to get from the Missouri Pacific officials the restoration of the Iron Mountain system and a promise to submit to their Board of Directors the question whether the company shall agree to the report of the special committee which provides that all questions of percentages shall be left to arbitration by a committee consisting of Chairman Midgley and two members to be selected by the roads. The report also provides that the revision of the agreement and that the revised agreement continue in effect until March 31, 1896, and thereafter be subject to 60 days notice of withdrawal by any line. If the action of the Missouri Pacific heretofore is to be considered as an indication of its future course in respect to this agreement, there is no hope whatever that the association will be reorganized. If not, a general collapse in rates will not be improbable.

After disposing of the freight problem in this manner, the executive officers tackled the passenger situation, which their general passenger agents have been wrestling with for six months without success. The result of their labors was the adoption of a preamble reciting that the incomplete organization of the Western Lines Passenger Association has necessarily affected its usefulness, and the passage of resolutions that the chairman be directed to call a meeting of passenger agents interested in traffic in the territory east of the Missouri River, St. Paul, Minneapolis and Duluth (including Utah Territory if desired) to formulate a "restrictive agreement, including penalties for violation." If the passenger agents cannot agree, they are to call in the executive officers immediately interested, and if they disagree the whole matter is to be referred to a general meeting of executive officers. Similar meetings of passenger agents interested in so-called trans-Missouri business and in business in Texas and southwestern territory are to be called. In pursuance of these resolutions, Chairman Caldwell has called a meeting of general passenger agents in the eastern committee and trans-Missouri territory for June 11.

At a meeting of representatives of roads east of the Mississippi and north of the Ohio rivers held here last week it was agreed, subject to the vote of the Louisville, Evansville and St. Louis Air Line, to restore rates on packing house products June 14 in conformity with the action of the presidents of roads south of the Ohio River. The cut has been nine cents from Kansas City and five cents from St. Louis southeastern territory and was instituted primarily by the Louisville & Nashville on the ground that the Cairo Short Line had been cutting the rate.

A meeting of managers of eastern lines is in session here to-day considering matters connected with the eastbound freight agreement. The officials of the association assert that the agreement is working well and that no collapse is imminent as is claimed by some of the reporters. I am inclined to believe that the officials know what they are talking about. A meeting of passenger representatives of eastern lines is also being held this week at which the most important subject docketed for consideration is the proposed adoption of rules reducing the party rate charge, and providing that parties of from 10 to 49 may be furnished tickets at 2 cents per mile per capita; parties of 50 to 100, 1½ cents; parties of 100 and not less than 200, 1¼ cents, and parties of 200 or more, 1 cent a mile.

The shipments of eastbound freight, not including live stock, from Chicago, by all the lines for the week ending June 1, amounted to 38,909 tons, against 47,213 tons during the preceding week, a decrease of 8,304 tons, and against 49,417 tons for the corresponding week last year. The proportions carried by each road were:

Roads.	Week to June 1.		Week to May 25.	
	Tons.	p. c.	Tons.	p. c.
Michigan Central	2,542	6.5	3,787	8.1
Wabash	1,871	4.8	3,320	7.0
Lake Shore & Mich. South.	3,999	10.2	8,587	18.2
Pitts., Ft. Wayne & Chicago	7,995	20.5	7,869	16.7
Pitts., Cin., Chi. & St. Louis.	3,116	8.1	3,869	8.2
Baltimore & Ohio	4,007	10.3	4,539	9.5
Chicago & Grand Trunk	5,452	14.0	5,152	11.0
New York, Chic. & St. Louis	3,281	8.4	4,459	9.3
Chicago & Erie	3,846	9.9	3,866	8.2
C., C., C. & St. Louis	2,800	7.3	1,769	3.8
Totals	38,909	100.0	47,213	100.0

Of the above shipments 1,896 tons were flour, 13,923 tons grain and mill stuff, 6,185 tons cured meats, 7,742 tons dressed beef, 1,618 tons butter, 1,021 tons hides, and 5,335 tons lumber.